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THE NATIVE IN RELATION TO THE PUBLIC HEALTH.[1]

By C. E. COOK M.D., D.P.H., D.T.M. and H.,
Commissioner of Public Health, Western Australia.

THE importance of the Australian aboriginal and his descendants in the white Australian community is not sufficiently appreciated, even by those who purport to concern themselves most with his welfare.

The pernicious influences which the coloured races exercise upon the hygienic, social and economic development of areas where white settlement is sparse, and upon the public health where hybrid remnants concentrate in the poorer quarters of cities or on the fringes of country towns, continue for the most part unsuspected. Amongst the public only a few ill-informed and unenlightened enthusiasts concern themselves with the native welfare, and their endeavours are chiefly directed consciously, or unintentionally, to minimizing his contact with the white race and to shielding him in an artificial environment during his formative years from the influences of white civilization, beneficial and destructive alike.

This irrational and unpractical policy has, moreover, largely influenced the legislation of governments and the routine administration of native protection departments. Current protection policies tend to repress or shelter the native, not to adapt him to white civilization. The effect is for him to undergo evolution more or less in seclusion, with the ultimate production of a type unadapted to spontaneous integration into white society. Because these repressive or sheltering measures cannot be sustained throughout his life, or because they fail, he is sooner or later released into the community entirely unprepared psychologically, socially and economically to withstand the impact of the change.

In the present undeveloped condition of this State's sparsely populated tropical areas, where the white population is not predominant and where the conditions of its existence approximate to the primitive, there is a real danger that the ultimate product of community evolution will more nearly resemble the uncultured coloured component than the more civilized white. Evidence is not lacking that northern communities have already travelled some distance along this road.

Over the narrow strip of country north of the Tropic of Capricorn and extending from Exmouth Gulf to Wyndham, the population at last census totalled less than 5000, inclusive of hybrids and Asiatics, but exclusive of full-blood aborigines. The aboriginal population for the area was estimated at approximately 18,000. Differential figures for population and vital statistics in respect of racial components are not at present accessible, but it is important to realize that the proportion of coloured persons in what purports to be the white population is great, and that there is good reason to believe that the natural increase of the coloured races is far in excess of that of the white.

As long ago as 1932 an analysis of vital statistics in the Northern Territory revealed the disturbing fact that, whilst the natural increase among whites in that year was 0·3 per thousand, the natural increase of half-castes was 16·2—some 50 times greater.

The following comments made at that time on these figures are probably equally true today:

> The figures reflect a serious position in that:
>
> (*a*) Increase in the white population must be by immigration.
>
> (*b*) The half-castes already approximating in number one-third of the European population, show a very high natural increase, a feature which presages a colour problem of the first magnitude. A very high birth rate is featured by other coloured races. Were

[1] Read at a meeting of the Section of Public Health, Tuberculosis and Tropical Medicine, Australasian Medical Congress (British Medical Association), Sixth Session, Perth, August, 1948.

figures available permitting the collation of births to females of child-bearing age, they would reveal a prolific fertility.

In order the better to understand the public health problem confronting us, it would be well briefly to survey the factors involved in it, as they relate to the conflict of two incompatible civilizations.

In his native state the Australian aboriginal was migratory, moving over a wide terrain in small groups, never establishing a permanent settlement, practising no husbandry or cultivation, but living exclusively upon the products of the hunt and the bush vegetation. It is probable that before the entry of the European to his country, he was practically free from infectious disease as we know it. The effectual measure of quarantine inherent in his natural mode of life would tend towards the elimination of the more acute air-borne infections and his habitual nudity made a valuable contribution towards his protection from those parasitic insects which have been common vectors of disease amongst clothed white races. His migratory habit in tiny bands from water to water in a country subject to extremes of flood and drought—his total abstention from community life and the impermanency of his camp sites, one must suppose, would have minimized to the point of ultimate complete elimination those acute diseases of bowel-borne epidemiology which have so long harassed the white races. The latter, living in permanent closely settled and insanitary communities, has been over the centuries under the necessity of evolving measures to eliminate the epidemiological risks inherent in the concentration of masses of human wastes in the community and in the vicinity of its water supply.

Free from the scourge of epidemic disease, the native civilization evolved without any organization or religious or social sanction directed towards epidemic control, and one would expect—as indeed the white invader found—the native to be completely ignorant of the ætiology of infectious disease, quite devoid of any knowledge of the importance of sanitary prophylaxis and secure from infection, notwithstanding habitual breaches of the elementary principles of sanitation as we know them.

The intrusion of organized white settlement into such an unprotected community must inevitably introduce a number of major problems in hygiene for both races, and it is an unfortunate fact that these problems have not been effectively met by either race.

The invasion of tribal hunting grounds and camping waters by the white man's live stock necessitated the concentration of natives, as far as possible, near the homestead where they would not disturb the cattle. The economic demand for labour for the white man removed in great measure the more efficient hunters from the clan, leaving the aged and the young with a feeding problem which drove them to the vicinity of white settlement, there to supplement the now meagre native diet with European food. This was more or less liberally afforded them by the white intruder, as an encouragement to them to cease the migration which disturbed and impoverished his live stock, to remove the temptation to kill his cattle as a source of meat supply, and to remain readily available as a source of free labour about the settlement.

Aping the white men, these natives concentrated near white settlement and began to live in semi-permanent and permanent shelters, rather than behind the brush windbreaks of their forebears. Inadequate material being available for these, they evolved from scrap iron, timber, textiles or brush, and in them the natives and their dogs herded under conditions of gross overcrowding with fires to keep them warm. Air-borne disease introduced by carriers in the white population became a prolific source of acute and chronic disease amongst them.

Simultaneously natives acquired the habit of using clothing, usually that discarded as unserviceable by the white settlers. This clothing was worn with entire disregard for cleanliness or for climatic conditions, and without any appreciation of the conventional purpose of any particular garment.

The necessity of relying largely upon the bounty of the white settler resulted in a serious disturbance in the quality and balance of the daily ration. Ration issues from the store were usually limited to meat, flour, tea and sugar, which assuaged hunger sufficiently to induce the recipient to neglect supplementing his diet with that native game and vegetable food necessary to assure him an adequate intake of protective vitamins.

Perhaps, however, the most serious consequence of this new and unfamiliar community life, both to the native and to the white, was the gross insanitation of the camps. No provision was made for the safe disposal of food wastes and the accumulated filth bred swarms of flies. No control was exercised upon the disposal of human excreta, which, according to the natives' usual practice, were deposited promiscuously throughout the camp and in its immediate vicinity. No measure was taken for the protection of water supplies, and as camps were inevitably sited in close proximity to the water, preferably in the beds of rivers and creeks where they were sheltered from the wind, the pollution of permanent and temporary water supplies became universal.

These conditions in most areas continue unimproved today, and, in fact, constitute the usual environment in which the white race and the black live together, not only in Australia's sparsely populated tropics, but also where migratory hybrid families live on the outskirts of towns in the more densely settled temperate areas. In effect, therefore, a race wholly unadapted to community life has been brought more or less abruptly to live in communities, and the white agents in this social revolution appear to have been completely unaware of the epidemiological dangers involved, either to the natives or to themselves.

No effort whatever has been made to train the native in the obligations and necessary safeguards of community life. The incompatibility of the new environment with his own social training and experience has been overlooked, and he has been admitted to the white community wholly unadapted for integration into it. His inevitable failure to achieve and maintain a reasonably high standard of living in the abnormal environment into which he has been thrust without any preparation has resulted in his segregation by the community for its own protection, so that the influences obstructing integration continue unchecked.

The interbreeding of the native with other coloured races and with the white race, and the further process of interbreeding between these hybrids, has now aggravated this serious social problem.

It is inevitable that this mixed population, lacking as it does a stable social structure, and living under conditions of squalor and insanitation, should be exposed to a high incidence of communicable disease. From the public health standpoint the most important of these include leprosy, hookworm, amœbiasis, malaria and tuberculosis.

Leprosy.

A quarter of a century ago there was no leprosy problem in this State's Kimberley division. Today the estimated incidence in the native population there is 1 in 50, with no sign of abatement notwithstanding efforts at rigorous control. The employment of natives in white households in intimate domestic contact with children, the intermarriage of natives with the white race and the raising of a generation of hybrid children having contact elsewhere with children of European stock, create a situation threatening the wide dissemination of leprosy from the coloured to the white race and imperil the security of the white population.

Hookworm.

In 1923 hookworm was reported in the Beagle Bay area. Ineffectual methods of control since applied sporadically have failed to affect its incidence. This disease is now established as endemic in suitable foci of the Kimberleys, and unless eliminated will continue to be a lasting threat to the population of these areas by a virile white people.

Recent reports on the sanitation of infected areas indicate deplorable conditions of neglect of the first

principles of hygiene and the existence of practices eminently suited to wide dissemination of infection.

Amœbiasis.

The incidence of amœbiasis amongst ex-prisoners of war and amongst immigrants from central Europe provides a nidus for the infection of native races. The grossly insanitary practices of the latter, more particularly in respect of nightsoil disposal and the infection of water supplies, threaten a wide dissemination of amœbic infection through both the coloured and the white populations.

Malaria.

The heavy and extensive breeding of vectors of malaria characteristic of the late wet and early dry seasons in the north, periodically sets the stage for epidemics of malaria.

From time to time the introduction of the subtertian parasite has produced serious epidemics of high fatality. In 1934 such an epidemic had killed sixteen of the meagre white population of the Fitzroy Basin and not less than 150 natives before it was realized that the condition was not influenza.

Tuberculosis.

Tuberculosis, introduced by European and Asiatic immigrants, has now involved the native population. Its extent has not yet been ascertained, but it must be expected to spread rapidly and extensively through the coloured community, which will in turn serve as a reservoir for its further dissemination to the white population of the future.

Other Diseases.

The people of the Commonwealth are now also confronted with the real danger that smallpox, typhus, cholera and yellow fever may, owing to the disruption of health services in adjacent parts of Asia, and to the increased rapidity of modern air transport, be introduced to the north by aircraft at any time. The conditions existing there are such as to favour the uncontrollable dissemination of these quarantinable diseases should they be introduced, and their ultimate extension to the rest of Australia would then be an imminent probability.

The Problem.

Clearly the adaptation of the native to community life and his successful integration into the white social structure are public health problems of the first importance. Indeed, no department of government administration is more vitally affected than that of public health by the nation's failure successfully to orientate the native component into its general population. Nor is any more suitably equipped for attempting the solution of the problems arising from this failure.

Measures necessary for meeting the problem include the following: (i) Education of the native in citizenship, with particular emphasis upon the eradication of his background of hygienic irresponsibility and substitution of a consciousness of community obligation. (ii) Education of the white community in its responsibilities and obligations to the native and in the necessity for his social integration. (iii) Provision for the hygienic housing of natives in local authority areas. Suitably designed and sited dwellings, provided with adequate and safe water supply, sanitation and where available electric light and power, should be provided in country towns for the accommodation of native families at present living on the fringes of townships under substandard conditions. (iv) Particular requirements for the north: (*a*) an adequate health organization, including medical officers of health and qualified health inspectors; (*b*) adequate and safe reticulated supplies of potable water in all settled communities; (*c*) installations for the efficient bacteriolytic sewage treatment of nightsoil in townships; (*d*) complete cleansing of all centres of population and their environs, and the development of efficient systems of waste disposal; (*e*) demolition of substandard dwellings and their replacement by suitable living accommodation; (*f*) the clothing of the health authority with all legal powers in respect of the native necessary to permit control of the conditions of employment and of the standards of housing, sanitation, diet, medical care and education to be maintained in institutions and elsewhere.

The cost of the necessary organization and associated public works would not be light, and it is to be expected that, there being no loud popular clamour for it, the expenditure involved would be an unwelcome item on a State or Federal budget. Until a considerable body of public opinion realizes that the native population constitutes an increasingly serious menace to the health and to the social security of the Commonwealth at large, it is unlikely that any effective effort will be made to meet the problem.

Perhaps the danger from quarantinable diseases will be regarded as remote, or assurance will be derived from the reflection that the quarantine service has excluded these in the past and may be trusted to succeed in doing so indefinitely in the future.

Perhaps the incidence of endemic disease amongst natives and the white communities with whom they live may be dismissed by Australians at large, who do not at the moment share the risk, as a matter of relative unimportance. If these public health considerations carry no weight, there is yet a social danger of no little magnitude which may stimulate Australia's complacent population to action.

Uneducated, bewildered, without any tangible point of contact with white citizenship and with no stable foothold in the social structure, psychologically unequipped for community life and outcast from white society, the native hybrid must remain a ready prey to agitators and a receptive field for subversive ideologies. His rapidly increasing numbers promise that he will shortly dominate the population in substantial areas of this continent, and at a time when it is considered expedient to provide for defence against invasion from Asia, neglect of this social and military problem within our lines can be viewed only as crass stupidity.

HYPERKINETIC OR OVER-ACTIVE BABIES.[1]

By H. Boyd Graham, D.S.O., M.C., M.D., F.R.A.C.P.,
Honorary Physician to In-Patients, Children's Hospital, Melbourne.

Obstetricians, general practitioners, pædiatricians and infant welfare nursing sisters often find it difficult to cope with the problems that arise because of the development of what may be described as the hyperkinetic type of personality pattern among infants under professional supervision. The presence of this pattern is not identified as a rule, and even if its presence is vaguely sensed, its basic importance as a factor in the production of certain commonly experienced difficulties in feeding and management has not hitherto been clearly established. It should therefore be worth our while to discuss some of the clinical characteristics of hyperkinetic babies and the syndromes presented by them. We may be able to clarify some of the issues and to suggest practical solutions of some of the problems.

If we come to think of it, we must admit that many of the elements that are compounded to form the personality pattern are very plastic in neo-natal and early post-natal life. Like the structures, the functions of the body, for better or for worse, develop very rapidly in early life, showing evidences of any distortion or incoordination in relation to each other. The growth of the personality pattern is of great importance to the individual. It is

[1] Read at a meeting of the Section of Pædiatrics, Australasian Medical Congress (British Medical Association), Sixth Session, Perth, August, 1948.

modified considerably by environmental factors, many of which are susceptible to improvement as the result of expert advice.

The personality pattern is formed on the basis of structural and functional development under the influence of hereditary trends and environmental conditions. We should expect to find signs of biological inferiority or superiority of any of the tissues of the body, and to find variations in rhythm, coordination and interrelationship of function. We should allow for these fluctuations even when ante-natal development has been normal and the infant has successfully negotiated the hazards of birth and there are no apparent abnormalities at or soon after birth. Post-natal environmental factors and the impact of other personalities affect the growing pattern of the baby's personality. Favourable changes will be produced by comfortable surroundings, a suitable and adequate food supply and contact with loving, patient and intelligent parents, siblings and attendants; and, conversely, unsatisfactory environmental conditions will alter the pattern in undesirable ways. Behaviour reactions and responses to stimuli are motivated to a notable extent in accordance with the ingredients that compose the pattern, and in turn provide the experiences that determine future characteristics, habits and actions.

The Characteristics of Hyperkinesis in Infancy.

When we apply these general reflections on personality to the study of individual babies we learn to identify the phenomena which recur often enough to enable us to classify the main types; and certain principles of management emerge from the tangled data in the case histories. The characteristics of hyperkinesis are complex, but some of the clinical pictures they form should be recognized.

The babies are likely to be slenderly fashioned and light in weight at birth, and may have arrived a little before the due date. It is not long before they display an over-reaction to stimuli and evidences of immaturity, such as neuro-muscular incoordination, spasticity, high metabolic rate and under-myelination of nerves. Quite commonly we find that the baby is the first child of parents, one of whom may be emotionally or temperamentally unstable; and it may be of more than passing interest to record that, in many instances, the parents have been unable to obtain a home apart from relatives, fellow boarders or occupants of adjoining flats. Usually a valiant attempt is made to feed the baby naturally, but the baby kicks and "fights the breast", cries unreasonably, especially at night-time, and shows a tendency to vomit a little or a lot, occasionally or very frequently. The symptoms are apt to appear soon after birth and to become accentuated when the mother and baby have left the maternity home. Lactation is likely to fail partially or completely, leading to the necessity to use an artificial feeding mixture. Whatever the feeding, difficulties in administration arise and dyspeptic symptoms such as colic and vomiting are rife. The baby refuses to be contented with suitable feeding, even when the amount of it would be ample for a normal infant. Repeated changes are often made without avail and without anything better than very small gains in weight. The nervous tension of the parents rises from disappointment, anxiety and loss of sleep. The mother, in her distracted state, often gives the doctor erroneous information by distorting and exaggerating the facts. At times it is necessary to remove the baby to calmer surroundings or to find someone to assist the mother in the home. The loss of morale results in inefficiency, which is seriously detrimental to the baby's prospects.

During this early post-natal phase of the life of the hyperkinetic baby the doctor may have to search for indications to operate for hypertrophic pyloric stenosis, or to have the cerebro-spinal fluid analysed, or to release hypothetical pus from behind the tympanum. Unnecessary investigations are to be deprecated in the circumstances. The doctor who does not always look only for the presence of a disease to explain symptoms will give himself the chance to make the correct diagnosis. He will interpret the sequence of events and reassure the parents and restore their morale. He will alter the environment favourably for the baby. He will give lucid and detailed directions about feeding and management and will not hesitate to prescribe antispasmodics and sedatives for the baby—and for the mother—increasing the dosage until the desired effect is obtained. The parents will gratefully transfer the responsibility to the doctor if he will undertake to supervise the management of the baby until progress is smooth and uneventful.

These troubles of the early weeks are likely to persist for many months in milder form and to be exacerbated as episodes brought about by nervous strain or over-stimulation. The baby may display all the characteristics of the nervous baby, later to become the "nervous child"; but there are other types of hyperkinesis in infancy. The baby who is over-emotional and full of "fears" and who cries lustily on the slightest provocation is hyperkinetic but not necessarily "nervous". The timid infant who starts at the slightest noise, even from sleep, who goes "stiff" in the limbs when handled, often later becomes over-attached to his mother, but does not show the play of anomalies of behaviour characteristic of the "nervous child". The demonstrative infant who "stages an act" when placed on the scales or in the bath often becomes aggressive and boisterous in childhood, but not typically "nervous". Many hyperkinetic babies become perfectly respectable members of society and the delight and joy of the home; but they will have their poor moments or days.

By the time the baby is a few months old it is usually possible to decide that he is endowed with intelligence beyond the average. He will respond early and in good measure to blandishments and soon smiles ecstatically, chatters imitatively and advances his arms to be lifted up. He is ceaselessly active while awake; positive, negative and spontaneous movements are all involved; gross motor movements, by dint of effort and practice, are early accomplishments; and coordinated movements become more accurate as immaturity vanishes. As the months go by he learns to chatter, shriek and become voluble ahead of the acquisition of a vocabulary. Imperiously he demands a lot of attention, and he should get it—quietly and without undue display of emotion. It does not take much to over-stimulate him, and he is apt to become troublesome and teasy when he is excited. He may even learn ugly baby tricks like tantrums in his efforts to manage his mother. Unquestionably these babies are hard to bring up; but because of their spirit and their intelligence the extra effort required yields rich rewards.

It is noticeable that hyperkinetic babies have a liability to rashes, which illustrates the close association existing between the skin and the nervous system. Wool rashes, dermatitis, eczema, "hives" of all descriptions and skin sensitivity to moisture, heat and friction are among the manifestations. The baby responds excessively to irritability by wriggling and by restlessness and by tearing at the skin when the opportunity offers. Any infant will show a generalized nervous reaction to a focal stimulus; but this attribute is demonstrable to such an extent that it seems certain that under-myelination of the nerves or unusual intercommunication of nerve impulses must be present.

It can be established very convincingly from case histories that febrile attacks with restlessness, refusal of food, diarrhœa and vomiting occur frequently which are ascribable to nervous origins. They often precede the piercing of the periodontium prior to the appearance of teeth through the gums, and they respond promptly to sedative and antispasmodic therapy. At times they seem to be precipitated by frights or falls or excitement. They may be regarded as instances of reflex nervous digestive disturbance. The baby does not look ill and is not "toxic", and recovers quickly under the influence of the medicine with temporary removal of solid food and administration of alkalis or alkaline earth preparations. It is important not to make the diagnosis of gastro-enteritis or colitis light-heartedly, as the treatment appropriate for infective conditions of the bowel will disturb the baby's progress.

It has also been noticed that hyperkinetic babies are especially apt to exhibit allergic phenomena when the

dietary is being elaborated after the age of six months. Many of the babies have shown a definite preference for food in savoury form over that which is sweetened in the normal manner; this may be indicative of a need for common salt. It would also seem likely that histamine shock may underly the allergic and digestive disturbances, perhaps because of incompleteness of tryptic digestion or deficiency of anti-histamine enzyme. The allergic and reflex digestive disturbances are by no means peculiar to hyperkinetic babies, but these infants react excessively no matter what the stimulus may be.

Classification.

The guises under which hyperkinetic babies appear in a doctor's consulting room are protean. A baby may present pylorospasm; another may be dyspeptic, or bilious, or underfed, or over-stimulated. We come upon instances in which eczema, urticaria or sheer mismanagement at first seems to be the appropiate label. Other babies may be regarded as merely nervous, timid or frustrated. Occasionally we suspect meningitis, encephalitis, pink disease, scurvy or infective conditions of the alimentary tract. Psychological syndromes also come up for consideration, such as undue mother-child attachment, unwarranted anxiety, infantile precocity, behaviour problems or mental subnormality. At times, from the outset, simple hyperkinesis and the hyperkinetic personality are the prominent features, or we may merely be impressed by the unusual cuteness or intelligence of the baby and the ineptitude of the mother. From this heterogeneous collection it is arbitrary to make a hard and fast classification; but in practice it is helpful in treatment to differentiate the following groups:

1. Simple hyperkinesis, usually associated with underfeeding, especially while the baby is very young, and with the developing evidences of over-activity and over-stimulation and the behaviouristic consequences which may simulate other well-known diseases.

2. Spasmodic hyperkinesis in which neuro-muscular incoordination of the alimentary tract is the main feature. This group includes hypertrophic pyloric stenosis, pylorospasm, habitual vomiting or possetting, colic, and spastic constipation. It is possible that cardiospasm and intussusception should be added.

3. Nervous hyperkinesis, in which we find various syndromes illustrative of over-excitability of the entire nervous system, or predominantly of one or other of its main divisions. Here we can place not only the extremely timid and nervous examples of hyperkinesis, but also the dermatological subjects, the allergic subjects and the instances of reflex diarrhœa and vomiting.

The Management of Hyperkinesis.

In the management of hyperkinesis it is essential to feed the baby properly, to reduce external stimuli and to allay anxiety. Frequently it is found necessary to prescribe drugs such as phenobarbitone, chloral hydrate, potassium bromide, phenazone, adrenaline, ephedrine, atropine derivatives and antihistamines. Appropriate combinations of these drugs may be made up so that one drachm of the mixture contains the daily amount to be given in divided doses shortly before each of the feedings. The doses should be increased progressively until the desired effect is obtained. As babies do not tolerate morphine well, it is not recommended that preparations containing morphine should be included. Administration of the sedative and antispasmodic mixtures should be maintained until the episode is under control, but may be discontinued in the intervals between episodes.

The reduction of external stimuli is effected by insisting on quietness, calmness, patience and gentleness on the part of the people who attend to the baby. It is sometimes necessary to prescribe sedatives for some of the adults to get this atmosphere for the baby. Over-clothing—by day or by night—and contact with woollen garments should be avoided. The use of the soap-stick or the insertion of a suppository is advocated for constipation until that cause of over-stimulation disappears as the dietary is corrected and the nervous system is brought under sedation. It is inadvisable to give aperients by mouth because of the interruption they cause to the rhythmic digestion of food. During the febrile disturbances a simple citrate elixir is distinctly beneficial, and kaolin can be used freely when nervous diarrhœa is a feature. It is not customary now to give castor oil, calomel, Dover's powder or tincture of opium. Soothing and antipruritic lotions are indicated for urticaria and appropriate ointments should be used for other skin lesions.

The problem of how to feed the baby properly is sometimes very worrying for all concerned. It must be emphasized that these babies need to retain suitable food of considerably higher caloric value than that theoretically required for normal babies and that they may need even as much as 50% in excess of the theoretical requirement. Of the total Calories, 16% to 18% should come from protein and not more than 30% from fat, unless the fat is in breast milk or is highly "homogenized" in a dried milk. In current nomenclature the composition of the desired mixture may be specified as "high protein, high sugar, low fat". The protein should be rendered readily assimilable by desiccation or by acidification with lactic acid if enough breast milk is not available. Butter-flour mixtures and feedings thickened with starchy cereals are contraindicated for the young babies and are not needed for the older ones. It is important to establish normal digestive habits and to supply normal food in regular sequence, to secure for the baby the great advantage of sound nutrition and sound digestive functional efficiency. As many of these babies lose nutriment by vomiting, it should be a cardinal rule to re-feed them soon afterwards unless the amount lost is negligible.

Summary.

The hyperkinetic type of personality pattern is described, the clinical characteristics of hyperkinesis in infancy are discussed and some of the resultant syndromes are mentioned and are broadly classified in three groups: (*a*) simple hyperkinesis, (*b*) spasmodic hyperkinesis, (*c*) nervous hyperkinesis.

The main principles of the management of hyperkinesis in a baby are to feed him properly, to reduce external stimuli, to allay anxiety and, when indicated, to prescribe sedatives and antispasmodics effectively in addition to the therapy required for the specific complaint which brings the baby into the doctor's care.

PENICILLIN AND STREPTOMYCIN IN THE TREATMENT OF HÆMOPHILUS INFLUENZÆ MENINGITIS.[1]

By JOAN TOM and STEPHEN WILLIAMS,
From the Royal Alexandra Hospital for Children, Sydney.

IN 1946, North, Wilson and Anderson published a survey of *Hæmophilus influenzæ* meningitis in Australia in relation to treatment with sulphonamides and type-specific rabbit antiserum. This paper, reviwing the results in cases at the Children's Hospital, Melbourne, the Royal Alexandra Hospital for Children, Sydney, and various other Australian hospitals, showed that of 157 children of all ages who received no specific treatment, only two (1·2%) recovered; that of 150 who were treated with sulphonamides, 32 (22·0%) recovered; and that of 81 who received *Hæmophilus influenzæ* Type B rabbit antiserum in conjunction with sulphonamides, 46 (56·8%) recovered.

It is clear from these figures, as well as from numerous American reports, that the introduction of type-specific rabbit antiserum represented a major advance in the treatment of this disease. Nevertheless the mortality rate remained formidable, and the striking success of penicillin

[1] Read at a meeting of the Section of Pædiatrics, Australasian Medical Congress (British Medical Association), Sixth Session, Perth, August, 1948.

in other types of purulent meningitis has led to trials of antibiotic therapy in this infection.

In spite of some confusion over the precise sensitivity of *Hæmophilus influenzæ* to penicillin, British workers obtained a good clinical response to large intrathecal doses, results which were the more evident as they were obtained without the additional administration of rabbit antiserum. In the meantime Alexander and her colleagues[2] had shown the value of streptomycin in *Hæmophilus influenzæ* meningitis, and since this has become widely available for clinical trial, it has shown itself to be the antibiotic of choice.

It is the purpose of this paper to review the results of antibiotic therapy in a relatively small number of cases of *Hæmophilus influenzæ* meningitis treated in this hospital in the last twelve months.

Until 1937 *Hæmophilus influenzæ* meningitis could be regarded only as a uniformly fatal disease. The outlook during the subsequent eleven years may be judged from Figure I, compiled from the records of this hospital. The progressive fall in mortality rate with the introduction of intensive and specific therapy can be seen. In 1947, when the administration of penicillin was contemplated, streptomycin was not yet available in Australia. The literature concerning the bacteriology and therapeutics of penicillin in *Hæmophilus influenzæ* infections was meagre and confusing, and it was felt necessary to carry out a considerable amount of laboratory work to establish a sound theoretical basis for treatment. The results of this investigation, published recently by one of us,[3] showed that a continously suppressive level of penicillin in the cerebro-spinal fluid could be maintained with twelve-hourly intrathecal injections of 20,000 units.

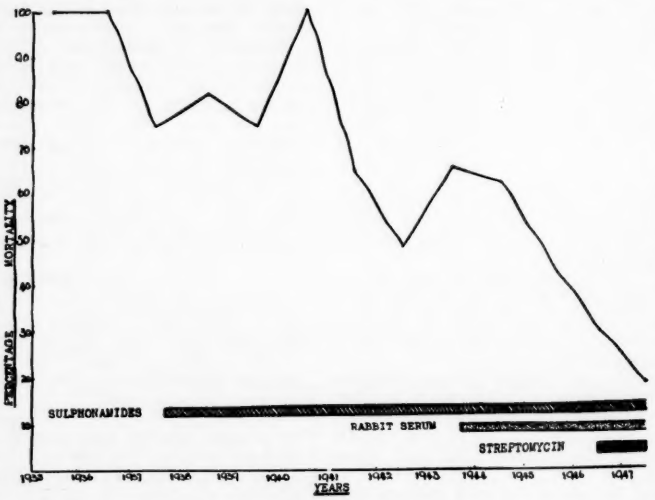

FIGURE I.
Deaths from *Hæmophilus influenzæ* meningitis.

While these conclusions were being reached, some 15 patients admitted to hospital were given penicillin in addition to sulphonamide and serum therapy. The doses were, however, for the most part too infrequently spaced to provide adequate suppressive levels, and the results therefore cannot be regarded as a true indication of penicillin's therapeutic possibilities. By the time we were in a position to apply a theoretically effective course of penicillin treatment, streptomycin had become available for use in the hospital.

So far 20 patients have been treated with streptomycin. Of these, seven are still in hospital, 13, representing consecutive admissions from November to April, being left for consideration in this paper. The main features are listed in Table I. Although it is realized that the number of cases presented is small, the following points call for comment.

Dosage of Streptomycin.

Intramuscular injections of streptomycin have been given in all cases, in a dose of 20,000 units per pound of body weight every twenty-four hours, with three or four evenly spaced intervals between injections. Intrathecal dosage was 30,000 to 50,000 units given in a concentration of 10,000 units per millilitre once every twenty-four hours. The earlier patients received intrathecal and intramuscular treatment for a period varying from six to nine days. Recently a standard treatment has been adopted of intrathecal injections for five days after the cerebro-spinal fluid has become sterile and intramuscular injections for the same period and for two further days after cessation of intrathecal therapy. It must be emphasized that all patients received full dosage of sulphadiazine and rabbit antiserum as well as streptomycin.

Infections of Long Duration.

In four cases it was surmised from the history that the meningitis had been in progress for more than fourteen days before diagnosis was made by lumbar puncture. Three of these children recovered completely and one died.

Infections in Infants.

The mortality figures given by North and his colleagues show a much higher death rate for children under two years of age than for the later age groups. Seven of our patients were aged under two years, and of these only one died, the remainder making complete recoveries.

Relapses.

Perhaps the most striking feature of our series has been the absence of clinical relapses, with or without the reappearance of the organisms in the cerebro-spinal fluid. With previous treatments a proportion of convalescent patients had such relapses, bacteriologically and clinically, often many weeks after the infection had seemed to be controlled, and died in spite of further treatment. In none of the cases in which streptomycin treatment was given has this occurred. Clinically, recovery has been uninterrupted after the first few days of treatment, and bacteriologically the cerebro-spinal fluid has remained entirely free from organisms after the initial intrathecal injection.

Toxic Effects from Streptomycin.

No evidence of immediate or delayed toxic effects has been observed. All children tolerated both intramuscular and intrathecal injections well, and throughout their period of treatment and follow-up have shown none of the vestibular or other phenomena which have been said to be associated with streptomycin therapy. It appears that the risk of such effects in the short course of treatment given is minimal.

Resistant Strains of Hæmophilus Influenzæ.

In all cases the organism was recovered from the cerebro-spinal fluid at the initial lumbar puncture, and in all it proved to be *Hæmophilus influenzæ* type B. Only four strains were tested for sensitivity to streptomycin, and they all came within the range given by Alexander for this organism. Cultures of the cerebro-spinal fluid in Levinthal broth and agar were attempted daily for the period in which streptomycin was given intrathecally, in order to detect the development of any possible bacterial resistance to streptomycin during treatment. Not only has no evidence of resistance been encountered, but, as was previously stated, no growth has occurred in any attempts at culture made during treatment.

Complications and Sequelæ.

One patient (Case VI) developed left hemiplegia before diagnosis, which remained present during the three months'

TABLE I.
Cases of Hæmophilus Influenzæ Meningitis.

Case Number.	Duration of Illness (Days) Before Treatment.	Age of Patient.	Severity of Illness.	Result.	Complications.	Duration of Intrathecal Streptomycin Therapy (Days).
I	5	3 years.	Severe.	Cured.	Nil.	5
II	1	2½ years.	Severe.	Died.	Nil.	2
III	30	11½ months.	Severe.	Cured.	Nil.	8
IV	1	6½ months.	Severe.	Cured.	Nil.	8
V	21	19 months.	Severe.	Cured.	Nil.	7
VI	18	18 months.	Moderate.	Cured.	Left facial paralysis; paralysis of left arm and left leg, 70 days.	9
VII	3	3 years.	Moderate.	Cured.	Nil.	5
VIII	5	2½ years.	Mild.	Cured.	Nil.	6
IX	16	9 months.	Severe.	Died.	Nil.	6
X	4	5 months.	Severe.	Cured.	Nil.	10
XI	6	17 months.	Mild.	Cured.	Nil.	6
XII	2	2 years.	Moderate.	Cured.	Nil.	5
XIII	1	6 years.	Severe.	Cured.	Nil.	7

stay in hospital. It has responded slowly to physiotherapy, and now, eleven months after the onset of the illness, remains only as a slight weakness of one leg. No other patient presented complications, and to date a careful follow-up check shows all patients to be normal, healthy children.

Mortality.

Two patients in this series died. One (Case II), a child of two and a quarter years, was admitted to hospital in a moribund condition, with a history of one day's sickness. Examination of the cerebro-spinal fluid revealed enormous numbers of organisms, and the child died after only two intrathecal injections had been given. Another (Case IX), aged nine months, was also admitted to hospital in a moribund state with a history of sixteen days' illness. In spite of streptomycin therapy this child showed no clinical response and died eight days after admission to hospital. It therefore appears that certain patients who have an overwhelming infection or in whom the disease has progressed far before diagnosis, will not respond even to this intensive combination of treatments.

Conclusions.

The two antibiotics penicillin and streptomycin are both effective in the treatment of *Hæmophilus influenzæ* meningitis. Clinical trials with penicillin in this hospital have not been extended to provide a series of cases for detailed analysis, but we have accumulated sufficient laboratory and clinical experience to show that, in adequate dosage, penicillin can be a useful addition to the existing methods of treatment. Streptomycin, however, would seem to be the antibiotic of choice, on the results so far obtained. It is simpler to administer than penicillin, involving only one intrathecal injection per day; it has produced no toxic effects in the dosage given to our patients; and it has demonstrated a remarkable capacity to terminate infections, abruptly and completely. Its use is not limited to the mild cases, but may be extended with considerable success to severe infections, often of long duration, and even in young infants.

The American authors Hoyne and Brown[4] have recently advocated treatment by intramuscular injection only, and express the opinion that immune rabbit serum may become an unnecessary adjunct to streptomycin. Time alone will show what modifications of this type, if any, may be possible. In the meantime we feel that treatment on the "battery" principle—namely, the combination of sulphonamides, immune serum, and streptomycin given by intramuscular and intrathecal injection—must be retained.

References.

(1) E. A. North, H. Wilson and G. Anderson: "The Treatment of Hæmophilus Influenzæ Meningitis with Sulphonamides in Conjunction with Hæmophilus Influenzæ, Type B, Rabbit Antiserum", THE MEDICAL JOURNAL OF AUSTRALIA, Volume I, 1946, page 215.

(2) H. E. Alexander, G. Leidy, G. Rake and R. Donovick: "Hæmophilus Influenzæ Meningitis Treated with Streptomycin", *The Journal of the American Medical Association*, Volume CXXXII, 1946, page 434.

(3) S. Williams: "Some Observations on the Role of Penicillin in the Treatment of Hæmophilus Influenzæ Meningitis", THE MEDICAL JOURNAL OF AUSTRALIA, Volume I, 1948, page 463.

(4) A. L. Hoyne and R. H. Brown: "Intrathecal Therapy not Required for H. Influenzæ Meningitis: A Report of 28 Cases", *The Journal of the American Medical Association*, Volume CXXXVI, 1948, page 597.

THE MAKING OF ABDOMINAL INCISIONS.[1]

By ALAN E. LEE, M.D., F.R.C.S.,
Brisbane.

WHEN a surgeon in the present day embarks upon an abdominal operation it is under very different circumstances from those that existed forty years ago. Almost always now an exact diagnosis has already been established in several ways, by a careful analysis of the patient's history, by physical examination and by the use of various ancillary methods, such as X-ray examination, biochemical tests and the visual examination of certain body cavities. The operation then becomes, not a part of the diagnosis, but a definite procedure in treatment alone.

We must not forget that till comparatively recent years there was no such diagnostic certainty. My own memory goes back to the times when gastro-intestinal radiology was virtually non-existent, when cholecystograms and excretion urograms were unknown, and when retrograde pyelograms were only in their infancy.

Clinical science was likewise uncertain, and a reading of text-books or current literature written about 1908 would show that great errors and much uncertainty existed as to the nature of the syndromes associated with the major surgical diseases of the abdomen.

It is little to be wondered then that an abdominal operation always commenced as a diagnostic procedure, a "look and see" adventure, and that the incision was planned

[1] Read at a meeting of the Section of Surgery, Australasian Medical Congress (British Medical Association), Sixth Session, Perth, August, 1948.

to allow the most complete examination of the abdominal contents.

Since the umbilicus represented about the centre of the abdomen, incisions were placed in close relationship to that structure. And since the surgery of the general abdominal cavity was historically an extension of pelvic surgery, for which a vertical mid-line incision had proved a natural and convenient approach, the incision for exploratory laparotomy became a vertical incision centred on the umbilicus, and, to avoid that structure, placed slightly to one side or the other of the middle line.

If such a paramedian incision was made of adequate length it allowed the fullest abdominal exploration, and with the muscular relaxation secured by deep general anæsthesia, it became possible to deal through it with almost all surgical abdominal procedures.

Certain post-operative sequelæ might occur, but since they were regarded as inherent in any abdominal surgery, there seemed no reason to question whether the incision employed was the best possible approach to abdominal disease.

These sequelæ were severe post-operative pain, frequent abdominal distension, often pulmonary complications, and sometimes the later development of scar hernia or intestinal obstruction. What I wish to discuss with you today is whether the standard vertical paramedian incision is really the best approach to abdominal disease in this new era in which the incision is usually required for therapy alone and not also for general abdominal exploration.

The Requirements of an Abdominal Incision.

We must ask ourselves first what we require of an abdominal incision, and I would suggest that the answers must be these: (i) that it shall give the most direct access to the site of the abdominal disease under treatment; (ii) that it can be repaired so firmly that scar hernia is unlikely to occur; (iii) that post-operative pain after its infliction shall be minimal; (iv) that it shall be least likely to be associated with chest complications; (v) that it shall not be likely to produce later intestinal obstruction.

Let us now discuss *seriatim* these various requirements.

Access to the Organ under Treatment.

Nature has so designed the abdominal cavity that the centre of it, the part beneath the umbilicus, contains that structure least likely to be the subject of surgical approach, that is, the small gut.

Almost all the surgical diseases of the abdominal cavity are related to its periphery, and if we draw a circle having its centre at the umbilicus we will find as we traverse its circumference in a counter-clockwise direction the gall-bladder, ascending colon, appendix, pelvic organs, sigmoid colon, splenic flexure, spleen and stomach.

Apart then from small gut obstructions and rare diseases of pancreas or transverse colon, almost all the surgical interventions in the abdomen are directed to points on its periphery rather than towards its centre. Direct access to these peripheral organs is obviously better secured by a peripheral incision than by one placed centrally.

Repair so Firm that Scar Hernia is Unlikely to Occur.

Though the abdominal cavity is lined with peritoneum, the real limiting membrane, the structure which confines its contents to their appointed space, is the transversalis fascia. Just as inguinal and umbilical herniæ are protrusions through gaps in this fascia, so are all scar herniæ basically of the same nature.

The scars least likely to result in subsequent herniation are those in which the transversalis fascia can be most firmly repaired. Compared to this factor partial destruction of the nerve supply to muscles and especially to the *rectus abdominis* muscle is of very secondary importance.

The transversalis fasciæ on each side are attached to each other in the middle line, above the semilunar fold passing posterior to the rectus muscle and fused with its fascial sheath, and below that level forming the immediate posterior relation of the muscle. Its fibres run transversely, and the effect of muscular contraction is to drag on the central attachment in the middle line. If we compare an incision made parallel to its fibres, that is, a transverse incision, with one made across its fibres, a vertical incision, we find that the latter has two defects. First, in its repair, sutures are placed in the line of the fibres, and these tend to tear out easily, and secondly, whenever its muscular attachments contract the tendency is to pull the wound edges apart. On the other hand, in the suturing of a transverse incision, the stitches are placed at right angles to its fibres; while muscular contraction draws the edges together and reduces tension on the suture lines.

Both theoretically and practically then the transverse incision is less likely to result in scar hernia than is the vertical paramedian incision.

Minimal Post-Operative Pain.

There are two main factors in the production of post-operative pain: (i) wound tenderness and its aggravation by tension, and (ii) post-operative distension, acting both by the production of deep pain, and by stretching of the tender abdominal wall incision.

If we regard the abdominal wall as a muscle we will notice that the manner of its action is largely that muscular bellies in each flank pull against each other across a central aponeurosis. In addition there is the action of the vertical *rectus abdominis* muscles, but this is part of the mechanism maintaining posture in the erect position, and plays little part in movement when the patient is lying in bed.

The main muscular function in bed is associated with respiration, coughing and defæcation. The greatest stretch will occur in an abdominal wall incision which is placed across the direction of muscle pull, that is, vertical.

Post-operation distension is a direct effect of the handling and subsequent paresis of small gut and its mesentery. Therefore the less an incision is placed over the small gut region, the less post-operative distension will be expected.

For both these reasons peripheral and transverse incisions are much less subject to post-operative pain and distension than are vertical median incisions.

Minimal Likelihood of Associated Chest Complications.

One of the most firmly established principles of recent years is that post-operative chest complications are related far more to the site of operation than to the anæsthetic employed, and that the mechanism of their production is associated with defective respiratory movement, the non-expulsion of bronchial mucous plugs and the production of atelectatic lung with secondary infection. In the post-operative phase the greater the degree of wound pain and the greater the abdominal distension, the more is respiratory movement likely to be impaired.

The diminution of post-operative pain by a properly placed incision is therefore a potent factor in reducing chest complications, as is the early rising which is also made safe by such means.

Miminal Likelihood of Later Intestinal Obstruction.

After every abdominal operation some adhesion formation is inevitable, and it is quite devoid of symptoms unless it results in interference with the function of a hollow organ. Practically post-operative intestinal obstruction means small gut obstruction; and the more a scar is likely to have small gut adherent to it, more likely becomes later gut obstruction.

Scars near the centre of the abdomen are therefore much more liable to such a complication than are those in the periphery of the abdomen.

The Vertical Paramedian Incision.

This consideration of the requirements for a good abdominal incision shows that on many counts the vertical paramedian incision has defects that are lessened by more peripheral incisions, and that many of the operative associations regarded formerly as inherent in abdominal surgery are in fact due to use of this incision.

It may be objected that these are theoretical considerations and not borne out by clinical experience, but I can state to you that since the general abandonment of

vertical incisions in favour of transverse I have been amazed at the smooth post-operative course of my patients, especially in regard to the reduction of abdominal pain.

Incisions to Replace the Vertical Incision.

The remainder of this paper will be a statement of those incisions that I believe should replace the vertical incision in the surgery of abdominal disease.

We have seen already that the ideal incision should be not only peripheral, but also transverse, and therefore the pararectal incision has not only no compensatory advantages, but also the minor defect that it partly denervates the *rectus abdominis* muscle on that side.

Since in the flank there is a limited space between the iliac crest and the lower ribs, the outer part of any non-vertical incision must start at a point between these bony areas, from which it can extend towards or even across the middle line either transversely or obliquely. The exact direction it will take is determined largely by the imperative indication of obtaining direct access to the organ under treatment.

To the surgeon unfamiliar with transverse incisions, the fact that these incisions may cut across the belly of one or both *rectus abdominis* muscles seems a matter for concern. In this regard, however, several factors need emphasis: (i) that above the umbilicus the muscle is attached to its sheath by the transverse lineæ, and therefore cannot retract; (ii) that muscle heals with the greatest rapidity; (iii) that as a matter of clinical experience repair takes place so rapidly that within ten to fourteen days after the making of an incision cutting across both recti, the patient can strongly contract these muscles, for example by sitting up from a lying position without using his arms, without any evidence of pain or muscle weakness.

The following are the essential steps in the making of an oblique or transverse incision: (i) A skin cut of adequate length is deepened to the external oblique aponeurosis and skin towels are applied. (ii) The external oblique aponeurosis and anterior rectus sheath are incised from the medial end of the incision to the outer border of the rectus and there deepened till a nick is made in the internal oblique aponeurosis. (iii) The edges of this nick are picked up with hæmostats, and the lateral border of the sheath is opened adequately. (iv) Fingers are inserted beneath the rectus muscle and it is steadily incised to its medial border, any bleeding points and the deep epigastric vessels being caught and ligatured. (v) The transversalis muscle is incised at the outer edge of the rectus, the peritoneum is opened and incised to the medial end of the incision. (vi) All layers of the abdominal wall are opened laterally to the desired extent, partly by cutting and partly by stretching apart.

In this way an incision of any required length, up to the full distance between the loins, can be produced. Through such an incision, without the use of mechanical retraction, adequate access is obtained to any structure in the abdomen.

If necessary, a transverse incision through the rectus muscle at the level of the tip of the ninth costal cartilage can be extended through the chest wall so as to make an abdomino-thoracic approach to the lower part of the œsophagus and cardiac end of the stomach.

Incisions made obliquely downwards to the pubic spine give most excellent approach to the pelvis, and partial or complete section of the lower part of the rectus muscle can be made with impunity.

Transverse incisions give adequate access to the colon on the right and left sides.

The Repair of Incisions.

Though this paper is entitled "The Making of Abdominal Incisions", a word may be said of their repair. At this time it needs no proof that the use of interrupted sutures of non-absorbable material is the best method of suturing an abdominal incision.

But since the closure of the transversalis fascia without any gaps is of such vital importance, it has seemed wise to combine in this layer the virtues of interrupted sutures with the accurate closure obtained by continuous suture.

The technique I employ for wound closure then is as follows. The transversalis fascia and peritoneum having been picked up by hæmostats, a suture of "00" catgut doubled is placed as a running suture, a start being made at the outer end. About every fourth bite of this suture is reinforced by an interrupted suture of cotton or silk. A few interrupted sutures of number 36 cotton are placed in the internal oblique muscle, and the anterior rectus sheath and external oblique fascia are then united by interrupted sutures of number 36 cotton, placed as simple sutures or as mattress or "X" stitches. Three deep cotton sutures are placed through the skin and fascia down to the external oblique, and the skin is sutured with a continuous mattress non-absorbable stitch.

An incision so repaired heals in my experience rapidly and cleanly, leaving often only a hair-line skin scar.

Summary.

To summarize, I have attempted to show that transverse incisions not only give better access to the abdominal organ under treatment, but by virtue of certain inherent qualities in these incisions which are absent in vertical mid-line or paramedian incisions, diminish post-operative pain, are associated with less chest complications, and are little liable to scar hernia or late intestinal obstruction.

THE TREATMENT OF DISSEMINATED SCLEROSIS BY PROLONGED LOWERING OF THE BLOOD PROTHROMBIN LEVEL.[1]

By LEONARD B. COX, P. FANTL and MILDRED FITZPATRICK,
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THE outlook in disseminated sclerosis is so grave that any treatment for which there is some scientific justification should be fully tested.

In January, 1947, Putnam and his co-workers[(1)] claimed that dicoumarol, which, given orally, reduces the prothrombin level of blood, had been signally successful in preventing acute exacerbations in this disease. The slowly progressive type, however, did not respond.

Previously Fantl and Nance[(2)] had found that the methyl derivative of dicoumarol, 3,3'ethylidene-bis-4-hydroxycoumarin (E.D.C.) was effective in reducing the prothrombin activity of blood, and that after prolonged treatment the recovery period after discontinuance of drug administration was shorter than in the case of dicoumarol, indicating a greater safety in control. Therefore it was decided to employ E.D.C. in a group of 30 unselected cases of disseminated sclerosis. In all, 29 of these proved suitable for treatment.

The rationale for such treatment had been set out by Putnam *et alii*,[(1)] who had given disseminated sclerosis extensive study over a number of years and published a series of papers. It is based briefly on the view that the characteristic plaques seen in the central nervous system in this disease are derived from thromboses in venules. Such thromboses are said by the authors to occur in other organs as well and not to be confined to the brain and cord. A considerable body of evidence has been collected in several studies to show that thromboses in venules of the central nervous system, whether produced experimentally or in the course of any disease, are surrounded by demyelination indistinguishable from that found in disseminated sclerosis.[(1)]

It is not our intention to discuss the validity of this view; but it is fair to state that, although there is agreement that thromboses are to be observed in many vessels in the plaques of disseminated sclerosis, there is by no means general acceptance that the neighbouring demyelination is the result of thrombosis. Indeed, it has been held

[1] This work has been supported by a grant from the National Health and Medical Research Council.

that the thromboses are rather the result of some substance entering the vessel from the plaque.

There is some clinical evidence in support of Putnam's view, for it is known that exacerbations of disseminated sclerosis readily occur after exposure to cold, infections, trauma and pregnancy, all of which may increase the clotting power of the blood. Evidence, too, has been provided by Simon[3] and by Simon and Solomon[4] of an abnormal lability of the clotting mechanism in disseminated sclerosis. There are, therefore, sufficient grounds for a well-controlled attempt to determine whether lowering of the clotting power influences the course of the disease.

Putnam and his colleagues treated 74 patients suffering from disseminated sclerosis with dicoumarol, although including only 43 in their study, as treatment of the remainder had not lasted for six months. Of the 43, in 16 cases the condition was of the slowly progressive type; in nine of these deterioration continued despite treatment, while in seven the condition remained stationary. However, 27 cases characterized by recurrent attacks were the significant group, and it is claimed that in 23 of these no further attacks developed during treatment.

Relapses occurred in the remaining four cases, but in two it was impossible to reduce the prothrombin level adequately, and in the other two "treatment was discontinued or greatly reduced for periods of several months, during which time acute symptoms appeared in both again". To quote these authors further:

> The aggregate number of months with interruptions subtracted during which all the 43 patients received adequate treatment was seven hundred and eighty-eight or approximately sixty-six patient years. During this time no relapse occurred. The records of these same patients show that they had had symptoms for an aggregate of two hundred and twenty patient years. Including the onset there had been 94 definite fresh outbreaks in this group of patients, or an average of 0·6 per patient year before treatment was begun.

Such results are indeed remarkable.

The Present Series: Method and Clinical Results.

The method employed was as follows. Before administration of E.D.C. to a patient a prothrombin estimation was carried out. Quick's technique was employed, and the estimation was carried out in venous or capillary blood. In the latter case capillary pipettes having marks at 0·02 millilitre and 0·2 millilitre were used. A solution of 0·1 M sodium oxalate solution was drawn to the first mark and then blood from the pricked finger was drawn through the oxalate solution to the second mark. The mixture was blown into small tubes (0·6 centimetre by 6·0 centimetres) and quickly sucked into the pipette and discharged into the tube. The specimens were centrifuged and 0·04 millilitre of the supernatant plasma was delivered into tubes (0·9 centimetre by 7·5 centimetres). The tubes were then transferred to a water bath kept at 37° C.; 0·08 millilitre of a mixture of equal volumes of 3% rabbit's brain suspension in 0·85% saline and 0·01 M calcium chloride solution was added. The clotting times obtained by this procedure were frequently checked with estimations obtained from venous blood plasma. The results from both techniques agreed satisfactorily when capillary blood was obtained from a freely bleeding puncture. The average coagulation time calculated from three normal donors was assumed to correspond to 100% prothrombin. Further prothrombin estimations of normal plasma specimens diluted with saline were carried out, and the coagulation time was plotted against the plasma dilution. From this standard curve the coagulation time of the patient's plasma was converted into percentage of prothrombin.

An unselected series of 30 patients seeming to be suffering from disseminated sclerosis was utilized for the study. Of these, all but one proved suitable for treatment. Treatment was abandoned in one case after a fortnight, and the longest time for which any patient has been under treatment is fifteen months. In 19 cases it was discontinued mainly because of the deterioration of the patient or of the occurrence of exacerbations of the disease of an acute type.

Of the 30 patients examined, 29 had prothrombin concentrations between 60% and 100%. One patient had a prothrombin concentration of 35% to 40% and was not accepted for treatment.

To suitable patients 0·5 gramme of E.D.C. was given orally on two successive days, followed by 0·3 gramme on the third day. A prothrombin estimation carried out on the fourth day indicated the amount of drug to be given subsequently. It varied, according to the response, from 0·1 to 0·3 gramme per day. It was aimed to keep the prothrombin level between 25% and 35%. This was possible in 26 cases, whilst in the remainder the prothrombin level did not fall below 50%, even when 0·3 gramme of E.D.C. daily for periods up to one month was taken. Prothrombin estimations were carried out twice a week and, for patients showing a steady response to the drug, once a week. No drug idiosyncrasy was reported in this group. All patients carried out their usual modes of living within the limitations of the disease.

Epistaxis was observed at prothrombin levels of approximately 40% in two cases. Ecchymoses, without apparent trauma, were reported in seven cases. Hæmorrhages occurred after from two to six months' treatment in four cases. Hæmorrhages at levels of 25% prothrombin and below are in accord with observations of other workers using dicoumarol. But ecchymoses were also seen in five patients who had prothrombin concentrations of 40%. Temporary reduction or cessation of drug administration resulted in all cases in the disappearance of the hæmorrhages in normal time.

Patients who had been kept for twelve months under treatment have taken from 40 to 70 grammes of E.D.C. Since no untoward reactions have been reported, the assumed safety of the drug seems to be confirmed.

In three cases treatment was discontinued during the first few weeks, twice on account of the obvious deterioration of the patient and once through the discovery of a severe anæmia. This patient, who had a normal blood prothrombin level before treatment, after taking 1·8 grammes of E.D.C. over six days was found to have a prothrombin level of 10%. Blood examination revealed a microcytic and hypochromic anæmia, which, however, may have existed before the drug was administered. The prothrombin level rose to 100% on the third day after discontinuance of treatment.

Complete blood examinations were made in all cases after several months of treatment, but in no case was the blood picture found to be influenced by the drug.

Twenty-five patients were treated for several months at least and twelve for well over a year. Three were resistant to the drug and satisfactory low levels were not regularly obtained. However, twenty-two were treated for reasonably long periods with satisfactorily low prothrombin levels. These cases may be conveniently analysed under three headings according to the clinical courses.

Cases in which Prominent Exacerbations Occurred during Treatment.

In four cases significant exacerbations occurred during treatment. In three of them the blood prothrombin level at the time lay between 20% and 25%. In the fourth it lay at 36%. It is therefore plain that exacerbations of disseminated sclerosis can occur with low blood prothrombin levels.

The course of the illness in these patients prior to treatment was of interest. In Case XVIII there had been nine prominent attacks in forty months before treatment, although none for eleven months before that. An exacerbation occurred five months after the commencement of treatment. In Case IV three attacks had occurred in thirty months prior to treatment, the last occurring just before its commencement; this patient (a female) had an exacerbation six months later. In Case II six exacerbations had occurred in fifty months before treatment, the last occurring just prior to its commencement; this patient (a female) had an exacerbation four months later. In Case XXVI one attack had occurred before treatment; this patient (a male) had an exacerbation two months later.

It will be seen, therefore, that those patients who have suffered frequent attacks of disseminated sclerosis in the past are likely to continue to do so despite their low blood prothrombin levels.

Cases in which Slow Deterioration or Minor Exacerbations Occurred during Treatment.

Our observations on the second group are in agreement with those of Putnam and his colleagues, who found the slowly progressive type of the disease uninfluenced by reduction of the blood prothrombin level. However, we find it difficult to accept the view that the slow progression in these cases results from the contraction of scar tissue; indeed, our studies of this series, and of a much larger group of untreated patients, suggest that the major causes of such deterioration are minor exacerbations—just as in the deterioration occurring with cerebral atheroma, although many exacerbations are dramatic, others are trivial or subclinical. Exacerbations of disseminated sclerosis are frequently seen which, according to the patient's description, last for a few hours only, and even the daily waxing and waning of the clinical disease cannot in our judgement be lightly dismissed as of no pathological significance.

This group is comprised of eleven cases, in which, whether the illness had previously been exacerbating or slowly progressive, unquestionable deterioration occurred during treatment. This seemed often to be the result of minor exacerbations, in that, although the patient could not give the date of the attack precisely, he could usually say to within a few days when his disability had increased. Often slight improvement followed such minor regressions, but the general course was regressive. In three of these cases, however, the blood prothrombin level could not be reduced below 50%.

Cases in which the Condition Improved during Treatment or Remained Static.

Improvement after acute attacks of disseminated sclerosis, whether treated or not, is so common that we attach no importance to its occurrence in this series. Often when it occurred, or when the course of the disease appeared static, reference to the past history showed the cases to have been of the infrequently exacerbating or slowly progressive type. Thus in Case I only three exacerbations had occurred in one hundred and twenty months, and none for twenty-four months before treatment was commenced. In Case XI three attacks had occurred in sixty months before treatment, which was commenced just after an attack, and none has occurred for fifteen months since. In Case IX four attacks had occurred in twelve years, although three had occurred in the last two, the last just before treatment, which has been in progress for nine months.

Conclusions.

We conclude from these results that there is no evidence that a considerable reduction of the blood prothrombin level with ethylidene dicoumarin has any beneficial effect on the course of disseminated sclerosis.

Although as a preliminary measure we had intended to compare the exacerbation rate of a group of personally observed untreated patients with that of the treated group, it was plain that such an analysis was not needed. However, it is of interest to note that an analysis of a group of 55 untreated patients showed a mean acute exacerbation time of 23·24 months as compared with that in the series of Putnam and his colleagues of 27·02.

We concluded that in this disease, whether treated or not, exacerbations are most likely to occur within a short period in those patients who have previously had frequent attacks. Conversely, attacks are less likely to develop when they have been infrequent in the past. Nevertheless, these patients may show, although not invariably, slow progression of the disease, as do those with the so-called slowly progressive type. This we hold as likely to be due to minor attacks.

We are at a loss to explain the discrepancy between our results and those of Putnam and his co-workers. The reduction in blood prothrombin level seems comparable in both series. It is presumably conceivable, although unlikely, that the Australian form of this disease differs in some way from the American. It seems hardly likely that the substitution of the ethylidene for the methyl radical in the drug used could be responsible for the divergence of results.

Summary.

Reduction of blood prothrombin level of patients suffering from disseminated sclerosis by ethylidene dicoumarin had no appreciable effect on the course of the disease.

References.

(1) T. J. Putnam, L. V. Chiavacci, H. Hoff and H. G. Weitzen: "Results of Treatment of Multiple Sclerosis with Dicoumarin", *Archives of Neurology and Psychiatry*, Volume LVII, 1947, page 1.

(2) P. Fantl and M. H. Nance: "The Hypoprothrombinæmic Effect of 3,3'Ethylidene-Bis-4-Hydroxycoumarin (E.D.C.): An Experimental and Clinical Study", THE MEDICAL JOURNAL OF AUSTRALIA, Volume II, 1947, page 133.

(3) B. Simon: "Blood Coagulation in Disseminated Sclerosis and Other Diseases of Brain Stem and Cord", *Archives of Neurology and Psychiatry*, Volume XLVIII, 1942, page 509.

(4) B. Simon and P. Solomon: "Multiple Sclerosis: Effect of Typhoid Vaccine and of Epinephrine on Coagulation of Blood", *Archives of Neurology and Psychiatry*, Volume XXXIV, 1935, page 1286.

Reports of Cases.

COOLEY'S ANÆMIA: REPORT OF A CASE.

By HENRY J. SINN, M.R.C.P., M.R.A.C.P., D.C.H.,
Honorary Physician to Out-Patients, Children's Hospital, and Honorary Physician to Newborns, Saint Vincent's Hospital (Maternity Section), Melbourne.

IN the classification of medical diseases there exist two main schools of thought. The first group as many diseases as possible under the one common heading, and the other subdivide and subgroup diseases into many types. The hæmatologists perhaps belong to the latter group. Von Jaksch set a stone rolling in this respect in 1889 when he described a form of anæmia with splenomegaly occurring in infants and small children. Since that date much has been written on what von Jaksch meant by his description, and even now the matter is by no means clear. It might be said that the rolling stone has gathered so much moss that its original form is scarcely recognizable. With improvements in hæmatological techniques and investigational methods, efforts have been made to define the syndrome more precisely, but even now there is confusion. Some regard it as simply secondary anæmia from syphilis, rickets or nutritional deficiencies with an abnormal marrow reaction. Others regard it as a definite disease entity and postulate that it is a type of primary chronic hæmolytic anæmia, occurring in infants and small children of all nationalities, with a characteristic blood picture showing leucocytosis as well as anæmia and also immature cells of the red and white series in the peripheral blood. Von Jaksch used the term *"pseudoleukemia infantum"*, and subsequently the finding of leucocytosis and myelocytosis showed how apt was von Jaksch's original name. The disease in many respects resembled familial hæmolytic anæmia or acholuric jaundice except that the results of fragility tests were normal or the cells showed increased resistance when placed in hypotonic saline solutions. It was also stated by some that the prognosis was very good and most patients recovered.

T. B. Cooley,(1)(2)(3) of Detroit, became very interested in von Jaksch's anæmia and wrote voluminously in the literature on the subject. He collected cases that appeared to fit into the syndrome, but soon discovered a series of patients with a condition that had striking features not hitherto described or at variance with the usual conception. These were: (i) a characteristic facies of the subject—

mongoloid appearance with high cheek bones and a muddy, slightly icteric complexion; (ii) a strong tendency to attack children derived from the Mediterranean littoral; (iii) unusual radiological characteristics, taken to be an effort by the marrow to compensate for the hæmolytic process. The other features conformed to von Jaksch's original conception, or what has become known as von Jaksch's anæmia: (i) chronic hæmolytic anæmia with splenomegaly occurring in childhood; (ii) a blood picture showing anæmia, leucocytosis and the presence of immature white cells as well as of normoblasts and megaloblasts in the circulating blood. The absence of increased fragility of the red cells helped to differentiate the condition from acholuric jaundice. Although the prognosis in von Jaksch's anæmia was always considered favourable, none of the patients of Cooley's series lived beyond the first decade. Further observations, however, have modified this gloomy prospect, for undoubted cases of the syndrome have been

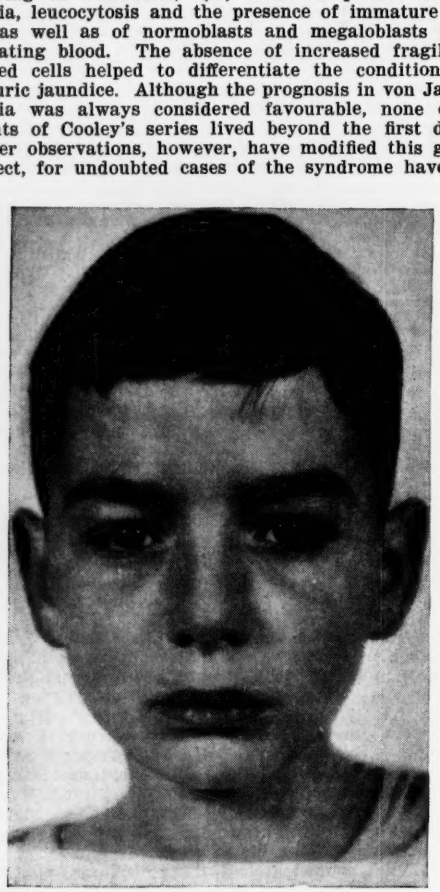

Figure I.

described in which the patients have had a longer lease of life, and indeed it has been shown that mild asymptomatic cases, revealed only by careful blood examination, exist especially in the family of a severely afflicted patient. The studies of Carl H. Smith[4] were interesting in this respect.

Reports of a large number of cases of the syndrome have appeared in the American literature, but in England, on the other hand, few cases have been recorded, the first being that of Moncrieff and Whitby[5] in 1934. So far no case has appeared in the Australian medical Press.

Clinical Record.

J.C. was first seen at the age of seven and a half years (his present age is eleven years and six months). Prior to this he had suffered no more serious illness than bronchitis at two months and a throat infection at seven years. He had an older brother, aged twenty-three years, and two older sisters, aged twenty and nineteen years respectively, all of whom enjoyed good health. His mother was alive and well. His father had been operated on for a gastric ulcer in 1934, but was otherwise well. There was no history of jaundice in the family. His father's mother was reported to have suffered from anæmia, but the nature of this was vague. He was born in Australia, though both his parents were from Ithaca, a small island between Greece and Italy, south of Corfu.

The history was that he had always been delicate, had a poor appetite, and was not gaining weight. On examination he was a thin child with rather a large prominent abdomen. His skin was a pale, earthy colour and there was some pallor also of the mucous membranes. The head was rather large, and the malar bones were prominent, giving the child rather a mongoloid appearance (Figure I). The tonsils were enlarged and unhealthy. The tonsillar glands were enlarged on both sides, but were not tender. Small glands were palpable also in both anterior and posterior triangles of the neck, and tiny glands were present in both axillæ with slightly larger glands in both groins. The liver was palpable three fingers' breadth below the right costal margin, and the spleen was moderately enlarged. The first blood examination was made by Dr. Reginald Webster on February 23, 1944, and was reported on as follows:

> Red blood cells, 3,650,000 per cubic millimetre; hæmoglobin, 55% (Sahli); leucocytes, 21,400 per cubic millimetre; colour index, 0·75. The film shows very pronounced anisocytosis and poikilocytosis, and although some large forms appear, the general tendency is to microcytosis. Polychromatic forms are not infrequent, and a large number of normoblasts and megaloblasts are present. There is a leucocytosis, but at the same time, the film does not give any impression of leukemia. All the white cells were mature types and were present in the following proportions: polymorphs, 63%; large lymphocytes, 28%; monocytes, 3%; small lymphocytes, 5%.

Biopsy of a gland removed from the left anterior triangle of the neck was carried out on March 16, 1944, by Dr. Andrew Brenan and was reported on as follows:

> The gland is surrounded by a well-defined fibrous capsule, and shows hyperplasia with numerous follicles. The fibrous stroma of the hilus is somewhat increased. There is nothing definite on which to make a diagnosis.

The fragility test on March 23, 1944, showed that there was only a faint trace of hæmolysis with 0·4% saline solution and even with 0·2% saline solution hæmolysis was not quite complete. The result of a Wassermann test carried out about this time was negative. X-ray examination of the chest on April 23, 1944, was reported on by Dr. John O'Sullivan as follows:

> The film made of the chest does not show any radiological evidence of any pulmonary or pleural involvement. There is no evidence of any mediastinal glandular enlargement.

In April, 1944, it was observed for the first time that his conjunctivæ were icteric. On August 7, 1944, his tonsils and adenoids were removed by Dr. Leonard Johnston.

The child was examined again in June, 1947. His mucous membranes were pale and the conjunctivæ were slightly icteric. The spleen was considerably enlarged, but the liver was within normal limits. Small glands were palpable in the neck, axillæ and groins, but were not thought to be significantly enlarged. Blood examination at this time showed the red cells to number 6,000,000 and the hæmoglobin value to be 55%. Examination of the blood smear showed anisocytosis, poikilocytosis, polychromatophilia and basophilic degeneration of the red cells. No nucleated red cells were visualized, nor were there any spherocytes. Target cells, however, were easily demonstrable in the film. Howell-Jolly bodies were present and the reticulocytes numbered 7%. There were 13,700 white cells per cubic millimetre. The Van den Bergh test gave a positive indirect reaction. The corpuscular fragility test again showed increased resistance of the red cells to hypotonic saline solutions rather than increased fragility.

On August 5, 1947, further blood examinations were made. The icteric index was found to be 20 (normal being less than five). The bilirubin content of the blood was 1·8 milligrammes per 100 millilitres (normal less than

0·5 milligramme per 100 millilitres), and urobilin was demonstrable in the urine. X-ray photographs of the skull and bony skeleton were taken on August 18, 1947, and were reported on by Dr. J. N. Burgess and Dr. A. Schuller as follows:

> Skull: Vault of normal size and shape, of abnormal thickness and structure; frontal bone 10 mm. thick, parietals and upper occipital squama 8 mm. thick. These bones are of spongy structure, rather porotic; laminæ interna and externa compact but thin. Sutures not distinct. Base of skull of normal configuration. Sella turcica of normal appearance; the *sulcus chiasmaticus* well pronounced. Frontal and sphenoidal sinuses not developed, mastoids partly pneumatised. Other pneumatic spaces well developed, clear. No intracranial calcification seen.
>
> Bony skeleton: General decalcification of the bones and increased striations. No irregularity of the epiphyses.

Summary.

A case is described fulfilling the criteria of Cooley's anæmia or so-called "target cell" anæmia. The child was descended from Mediterranean stock and presented the typical facies. Anæmia and splenomegaly have been constant features; although immature cells of the white series have not been demonstrated in two blood films taken, megaloblasts, normoblasts and "target cells" have been persistent findings. The fragility tests have shown increased resistance of the red cells to hypotonic saline solutions and the hæmolytic nature of the anæmia has been demonstrated. The moth-eaten appearance of the skull and the striations in the bony skeleton were thought to represent the early stages of a hyperplastic reaction of the marrow to the hæmolytic process. This, together with the age of the patient, would appear to indicate that the disease in this case was not as severe as in Cooley's own group.

References.

(1) T. B. Cooley and Pearl Lee: "A Series of Cases of Anæmia with Splenomegaly and Peculiar Bone Changes", *Transactions of the American Pediatric Society*, 1925.

(2) T. B. Cooley: "Von Jaksch's Anæmia", *American Journal of Diseases of Children*, Volume XXIII, 1927, page 786.

(3) T. B. Cooley, E. R. Witwer and Pearl Lee: "Anæmia in Children with Splenomegaly and Peculiar Changes in the Bones: Report of Cases", *American Journal of Diseases of Children*, Volume XXXIV, 1927, page 347.

(4) Carl H. Smith: "Familial Blood Studies in Cases of Mediterranean (Cooley's) Anæmia: Diagnosis of the Trait or Mild Forms of the Disease", *American Journal of Diseases of Children*, Volume LXV, 1943, page 681.

(5) A. Moncrieff and L. E. H. Whitby: "Cooley's Anæmia", *The Lancet*, Volume II, 1934, page 648.

Reviews.

A TEXT-BOOK OF HISTOLOGY.

No one who has read the writings of Alexander Maximow, especially in the original Russian or in German, can fail to have been impressed by his genius. Through all his work there shines that imaginative enthusiasm which is the mark of true greatness in any walk of life. His lucid descriptions of the multipotent mesenchymal cell, of the "lymphoid wandering cells" or of the development of the blood-forming tissues are as alive today as when they were written. The beautiful, precise drawings of his histological preparations of developing bone marrow are found in many text-books today. The publication of the fifth edition of "A Textbook of Histology", by Alexander A. Maximow and William Bloom, is therefore a most important event, for something of the work and spirit of the great Russian scientist lives on in its pages.[1] In the preface to the first edition Bloom wrote as follows: "At the time of his death in December, 1928, Professor Maximow" (he was then professor of anatomy in the University of Chicago) "was writing a text-book of histology. This was to be based as far as possible, both as to text and figures, on human material, and the functional aspects of the structures described were to be emphasized. For this work he had collected much new material and had made many new illustrations. He had completed the sections on the male and female generative organs, the urinary tract, the organs of special sense, and epithelium. In rough manuscript he left the sections on the blood and connective tissue, the gastro-intestinal tract, the blood vascular and lymphatic systems, the spleen, the integument, and the mammary gland. . . . There was also available the Russian text of 1918 in which the nervous tissues are treated very fully."

In his preface to this, the fifth, edition Bloom reminds us that: "The aim of this book, as in former editions, is to present the minute structure of the human body from a functional point of view. In keeping with this goal, extensive changes in text and illustrations were necessitated by advances made during the past six years by purely morphological means and through the adaptation of modern chemical and physical methods to histological problems." It is perhaps this approach, together with the very high standard of illustrations, that gives the book its vitality. Much of Maximow's own work of course is outmoded, but in his general feeling for the infinite potentialities in living tissue, his tendencies to regard it as dynamic, not static, he was essentially modern and was in advance of his time. Of the 532 illustrations, 32 of which are in colour, 125, signed A.A.M., are Maximow's original drawings. Advances in the field of histology have necessitated the rewriting of many portions of the book and the incorporation of additional illustrations, which include electronmicrographs and autoradiographs as well as photomicrographs and many excellent block drawings.

This is not an examination manual or an elementary text-book of histology for the medical student, unless, indeed, he is a student of exceptional ability and curiosity. It is rather a book of reference for the advanced student or pathologist, above all for the reader who is fired by a genuine interest in this branch of biology for its own sake.

[1] "A Textbook of Histology", by Alexnder A. Maximow and William Bloom; Fifth Edition; 1948. Philadelphia and London: W. B. Saunders Company. Melbourne: W. Ramsay (Surgical) Proprietary, Limited. 10" × 6½", pp. 718, with many illustrations, some of them coloured. Price: 59s. 6d.

THE FUNGOUS DISEASES OF MAN.

The mycoses quite naturally are usually looked upon as coming mostly within the provinces of the dermatologist and of medical practice in the tropics. During the last few years, however, the pages of The Medical Journal of Australia have contained several articles recording the presence of mycotic conditions elsewhere than in the skin and its appendages in temperate parts of this continent. Though these conditions may not be common, the general practitioner, the physician, the surgeon and the specialist may at any time meet with one of these rarities and be at a loss for a diagnosis till the aid of the pathologist clarifies the case. Thus Dr. N. Gohar's "Mycosis and Practical Mycology" can fill a useful role on the reference shelf of medical practitioners.[1] The dermatologist will find to his hand a concise account of the ringworms and allied infections of the skin that so often come his way.

The author is assistant professor of pathology and mycology in the Kasr el Ainy Faculty of Medicine, Fouad I University, Cairo, so his opportunities for study of the subject have doubtless been considerable. The book begins with a short account of the pathogenic fungi and their classification and the terms employed, and some general remarks on the mycoses. The author then proceeds to deal with the diseases caused by fungi under the headings of mycetoma (maduromycosis, actinomycosis, actinobacillosis); blastomycosis (coccidioidosis, rhinosporidiosis, histoplasmosis, chromoblastomycosis, blastomycosis of the central nervous system *et cetera*); mycoses of the digestive tract; sporotrichosis and hemisporosis; bronchomycosis, oculomycosis, otomycosis and genito-urinary mycosis; epidermophytosis (three chapters); and *pityriasis capitis*. The final chapter is on fungicides, fungistatics, prescriptions, media and a short reference to poisonous fungi (toadstools). In these chapters a short historical note is followed by a brief account of the fungi that have been held responsible, descriptions of the morbid anatomy and symptoms, the means of diagnosis and the treatment. The book is well illustrated by four plates in colour of cultures and 132 photographs or

[1] "Mycoses and Practical Mycology: A Handbook for Students and Practitioners", by N. Gohar, M.R.C.S. (England), L.R.C.P. (London), with a foreword by Sir Philip Manson-Bahr, C.M.G., D.S.O., M.A., M.D., D.T.M. and H. (Cantab.), F.R.C.P. (London); 1948. London: Baillière, Tindall and Cox. 8½" × 5¼", pp. 252, with 134 illustrations. Price: 25s.

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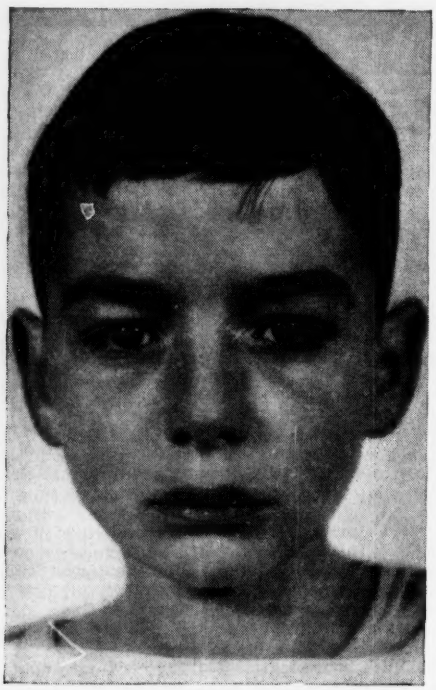

FIGURE I.

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> The film made of the chest does not show any radiological evidence of any pulmonary or pleural involvement. There is no evidence of any mediastinal glandular enlargement.

In April, 1944, it was observed for the first time that his conjunctivæ were icteric. On August 7, 1944, his tonsils and adenoids were removed by Dr. Leonard Johnston.

The child was examined again in June, 1947. His mucous membranes were pale and the conjunctivæ were slightly icteric. The spleen was considerably enlarged, but the liver was within normal limits. Small glands were palpable in the neck, axillæ and groins, but were not thought to be significantly enlarged. Blood examination at this time showed the red cells to number 6,000,000 and the hæmoglobin value to be 55%. Examination of the blood smear showed anisocytosis, poikilocytosis, polychromatophilia and basophilic degeneration of the red cells. No nucleated red cells were visualized, nor were there any spherocytes. Target cells, however, were easily demonstrable in the film. Howell-Jolly bodies were present and the reticulocytes numbered 7%. There were 13,700 white cells per cubic millimetre. The Van den Bergh test gave a positive indirect reaction. The corpuscular fragility test again showed increased resistance of the red cells to hypotonic saline solutions rather than increased fragility.

On August 5, 1947, further blood examinations were made. The icteric index was found to be 20 (normal being less than five). The bilirubin content of the blood was 1·8 milligrammes per 100 millilitres (normal less than

0·5 milligramme per 100 millilitres), and urobilin was demonstrable in the urine. X-ray photographs of the skull and bony skeleton were taken on August 18, 1947, and were reported on by Dr. J. N. Burgess and Dr. A. Schuller as follows:

> Skull: Vault of normal size and shape, of abnormal thickness and structure; frontal bone 10 mm. thick, parietals and upper occipital squama 8 mm. thick. These bones are of spongy structure, rather porotic; laminæ interna and externa compact but thin. Sutures not distinct. Base of skull of normal configuration. Sella turcica of normal appearance; the *sulcus chiasmaticus* well pronounced. Frontal and sphenoidal sinuses not developed, mastoids partly pneumatised. Other pneumatic spaces well developed, clear. No intracranial calcification seen.
>
> Bony skeleton: General decalcification of the bones and increased striations. No irregularity of the epiphyses.

Summary.

A case is described fulfilling the criteria of Cooley's anæmia or so-called "target cell" anæmia. The child was descended from Mediterranean stock and presented the typical facies. Anæmia and splenomegaly have been constant features; although immature cells of the white series have not been demonstrated in two blood films taken, megaloblasts, normoblasts and "target cells" have been persistent findings. The fragility tests have shown increased resistance of the red cells to hypotonic saline solutions and the hæmolytic nature of the anæmia has been demonstrated. The moth-eaten appearance of the skull and the striations in the bony skeleton were thought to represent the early stages of a hyperplastic reaction of the marrow to the hæmolytic process. This, together with the age of the patient, would appear to indicate that the disease in this case was not as severe as in Cooley's own group.

References.

(1) T. B. Cooley and Pearl Lee: "A Series of Cases of Anæmia with Splenomegaly and Peculiar Bone Changes", *Transactions of the American Pediatric Society*, 1925.

(2) T. B. Cooley: "Von Jaksch's Anæmia", *American Journal of Diseases of Children*, Volume XXIII, 1927, page 786.

(3) T. B. Cooley, E. R. Witwer and Pearl Lee: "Anæmia in Children with Splenomegaly and Peculiar Changes in the Bones: Report of Cases", *American Journal of Diseases of Children*, Volume XXXIV, 1927, page 347.

(4) Carl H. Smith: "Familial Blood Studies in Cases of Mediterranean (Cooley's) Anæmia: Diagnosis of the Trait or Mild Forms of the Disease", *American Journal of Diseases of Children*, Volume LXV, 1943, page 681.

(5) A. Moncrieff and L. E. H. Whitby: "Cooley's Anæmia", *The Lancet*, Volume II, 1934, page 648.

Reviews.

A TEXT-BOOK OF HISTOLOGY.

No ONE who has read the writings of Alexander Maximow, especially in the original Russian or in German, can fail to have been impressed by his genius. Through all his work there shines that imaginative enthusiasm which is the mark of true greatness in any walk of life. His lucid descriptions of the multipotent mesenchymal cell, of the "lymphoid wandering cells" or of the development of the blood-forming tissues are as alive today as when they were written. The beautiful, precise drawings of his histological preparations of developing bone marrow are found in many text-books today. The publication of the fifth edition of "A Textbook of Histology", by Alexander A. Maximow and William Bloom, is therefore a most important event, for something of the work and spirit of the great Russian scientist lives on in its pages.[1] In the preface to the first edition Bloom wrote as follows: "At the time of his death in December, 1928, Professor Maximow" (he was then professor of anatomy in the University of Chicago) "was writing a text-book of histology. This was to be based as far as possible, both as to text and figures, on human material, and the functional aspects of the structures described were to be emphasized. For this work he had collected much new material and had made many new illustrations. He had completed the sections on the male and female generative organs, the urinary tract, the organs of special sense, and epithelium. In rough manuscript he left the sections on the blood and connective tissue, the gastro-intestinal tract, the blood vascular and lymphatic systems, the spleen, the integument, and the mammary gland. . . . There was also available the Russian text of 1918 in which the nervous tissues are treated very fully."

In his preface to this, the fifth, edition Bloom reminds us that: "The aim of this book, as in former editions, is to present the minute structure of the human body from a functional point of view. In keeping with this goal, extensive changes in text and illustrations were necessitated by advances made during the past six years by purely morphological means and through the adaptation of modern chemical and physical methods to histological problems." It is perhaps this approach, together with the very high standard of illustrations, that gives the book its vitality. Much of Maximow's own work of course is outmoded, but in his general feeling for the infinite potentialities in living tissue, his tendencies to regard it as dynamic, not static, he was essentially modern and was in advance of his time. Of the 532 illustrations, 32 of which are in colour, 125, signed A.A.M., are Maximow's original drawings. Advances in the field of histology have necessitated the rewriting of many portions of the book and the incorporation of additional illustrations, which include electronmicrographs and autoradiographs as well as photomicrographs and many excellent block drawings.

This is not an examination manual or an elementary text-book of histology for the medical student, unless, indeed, he is a student of exceptional ability and curiosity. It is rather a book of reference for the advanced student or pathologist, above all for the reader who is fired by a genuine interest in this branch of biology for its own sake.

[1] "A Textbook of Histology", by Alexnder A. Maximow and William Bloom; Fifth Edition; 1948. Philadelphia and London: W. B. Saunders Company. Melbourne: W. Ramsay (Surgical) Proprietary, Limited. 10" x 6½", pp. 718, with many illustrations, some of them coloured. Price: 59s. 6d.

THE FUNGOUS DISEASES OF MAN.

THE mycoses quite naturally are usually looked upon as coming mostly within the provinces of the dermatologist and of medical practice in the tropics. During the last few years, however, the pages of THE MEDICAL JOURNAL OF AUSTRALIA have contained several articles recording the presence of mycotic conditions elsewhere than in the skin and its appendages in temperate parts of this continent. Though these conditions may not be common, the general practitioner, the physician, the surgeon and the specialist may at any time meet with one of these rarities and be at a loss for a diagnosis till the aid of the pathologist clarifies the case. Thus Dr. N. Gohar's "Mycosis and Practical Mycology" can fill a useful role on the reference shelf of medical practitioners.[1] The dermatologist will find to his hand a concise account of the ringworms and allied infections of the skin that so often come his way.

The author is assistant professor of pathology and mycology in the Kasr el Ainy Faculty of Medicine, Fouad I University, Cairo, so his opportunities for study of the subject have doubtless been considerable. The book begins with a short account of the pathogenic fungi and their classification and the terms employed, and some general remarks on the mycoses. The author then proceeds to deal with the diseases caused by fungi under the headings of mycetoma (maduromycosis, actinomycosis, actinobacillosis); blastomycosis (coccidioidosis, rhinosporidiosis, histoplasmosis, chromoblastomycosis, blastomycosis of the central nervous system *et cetera*); mycoses of the digestive tract; sporotrichosis and hemisporosis; bronchomycosis, oculomycosis, otomycosis and genito-urinary mycosis; epidermophytosis (three chapters); and *pityriasis capitis*. The final chapter is on fungicides, fungistatics, prescriptions, media and a short reference to poisonous fungi (toadstools). In these chapters a short historical note is followed by a brief account of the fungi that have been held responsible, descriptions of the morbid anatomy and symptoms, the means of diagnosis and the treatment. The book is well illustrated by four plates in colour of cultures and 132 photographs or

[1] "Mycoses and Practical Mycology: A Handbook for Students and Practitioners", by N. Gohar, M.R.C.S. (England), L.R.C.P. (London), with a foreword by Sir Philip Manson-Bahr, C.M.G., D.S.O., M.A., M.D., D.T.M. and H. (Cantab.), F.R.C.P. (London); 1948. London: Baillière, Tindall and Cox. 8¾" x 5¾", pp. 252, with 134 illustrations. Price: 25s.

drawings, most of them clinical. The author mentions that it is interesting to note that *Actinomyces* has been recovered from carious teeth, flourishing presumably as a saprophyte; one Australian investigator has found in sections of granulation tissue in a carious cavity granules showing well-marked clubs. One would have liked a fuller account of torula meningitis.

We consider that the author has fulfilled the aim outlined in his preface, namely, to supply the dermatologist and the general practitioner and the student of tropical medicine with a concise and practical guide to mycotic infections.

RADIOLOGY OF THE ALIMENTARY TRACT.

THE new edition of "Clinical Roentgenology of the Digestive Tract", by Professor Maurice Feldman, contains all the merits of the previous edition with all the shortcomings of a book compiled in this fashion.[1] On the credit side it is complete, but it is the impersonal, devastating completeness of a text-book which aims to leave nothing out. Such exhaustive treatment necessarily implies more or less a cataloguing of the literature, for no one man's experience even on a limited subject, can include all from alpha to omega. As a book of reference it is a splendid and exhaustive epitome of current knowledge compiled with scholarship and judicious selection. It seems particularly useful in its listing of those rarer diagnostic occasions which do not arise often, serving to remind the radiologist of the finer and shrewder clinical possibilities of his art. It is a truism that we never diagnose what we do not think of, and this compendium is well suited to refresh and stimulate a specialist mind, whose diagnostic acumen is being jaded by the constant reiteration of the daily obvious.

Professor Feldman never lightens his task with the personal touch, but leaves the reader to digest all the material in his own intellectual craw without much guidance or critical comment. The flatulency of such a method is obvious, but is no special demerit, if we accept the work purely as one of reference for specialists and acknowledge its usefulness.

It is essentially not a book of instruction for early students of radiology, as it builds no individual house of its own, but is a diffuse thing of bricks, walls and foundations without the interior finish and decoration of personal inspiration and conviction.

As a "source" book it will be a very useful addition to any radiologist's library, and Professor Feldman may well be congratulated on providing such an excellent and comprehensive review of current radiological knowledge in this subject. The impersonal attitude of a detached recorder of facts which is adopted should not blind the reader to the great industry and practical experience behind its production, or to its value as a periodic balance sheet of those radiological assets concerned in the study of gastro-enterology.

ENURESIS OR BEDWETTING.

AMONG children enuresis is a familiar complaint which does not always undergo a natural cure. The most striking feature of the causative factors is their multiplicity and non-specific character. This explains but does not excuse the attitude of both the profession and the lay public in the past. Without thorough investigation of the patient himself, and his surroundings at home and at school, the outlook may well become hopeless. The most important factor is lack of training in infancy, combined with deep sleep. R. J. Batty, in the second edition of his book,[2] sets out a practical routine for the investigation of the patient together with suggestions for treatment at home and at school. The mechanism of micturition is dealt with at some length and illustrated by clear diagrams; anatomical and physiological details are given and lead up to the psychological approach to the problem, and a bibliography concludes the volume. This book should be closely studied by general practitioners, and all who look after children in schools and institutions.

[1] "Clinical Roentgenology of the Digestive Tract, by Maurice Feldman, M.D.; 1948. Baltimore: The Williams and Wilkins Company. Sydney: Angus and Robertson, Limited. 9" × 5¾", pp. 916, with 641 illustrations. Price: 60s.

[2] "Enuresis or Bed-Wetting", by R. J. Batty, M.D., B.Sc., D.P.H.; Second Edition; 1948. London, New York and Toronto: Staples Press, Limited. 7" × 4½", pp. 106, with nine illustrations. Price: 9s. 6d.

Books Received.

[The mention of a book in this column does not imply that no review will appear in a subsequent issue.]

"Techniques of Histo- and Cytochemistry: A Manual of Morphological and Quantitative Micromethods for Inorganic, Organic and Enzyme Constituents in Biological Materials", by David Glick, Ph.D., with a foreword by Robert R. Bensley, M.B., D.Sc.; 1949. New York: Interscience Publishers, Incorporated. London: Interscience Publishers, Limited. 9" × 6", pp. 564, with 159 illustrations. Price: $8.00.

A collection of methods of investigation of biological materials put together on an historical pattern.

"Introduction to Physical Biochemistry", by J. M. Johlin, Ph.D., D.Sc.; Second Edition; 1949. New York: Paul B. Hoeber, Incorporated. 9¼" × 6", pp. 278, with a few illustrations. Price: $3.75.

A survey of facts considered to be fundamental in the better understanding of various biological phenomena and of laboratory procedure.

"The 1948 Year Book of General Surgery", edited by Evarts A. Graham, A.B., M.D.; 1948. Chicago: The Year Book Publishers, Incorporated. 7" × 4½", pp. 722, with 190 illustrations. Price: $4.50.

Abstracts of recent contributions to general surgical literature.

"Aids to Psychology", by John H. Ewen, F.R.C.P.E., D.P.M.; Third Edition; 1948. London: Baillière, Tindall and Cox. 6¼" × 4", pp. 208. Price: 5s.

A brief account of psychology for revision purposes, especially for those studying for a diploma in psychological medicine.

"The Emotional Problems of Childhood: A Book for Parents and Teachers", by Zoë Benjamin, with a foreword by Professor H. Tasman Lovell; 1948. London: University of London Press, Limited. 7¼" × 4¾", pp. 296. Price: 8s.

The author deals with problem-situations which can arise for parents and others with children of all ages.

"Lung Dust Lesions versus Tuberculosis", by Lewis Gregory Cole, M.D., F.A.C.R.; 1948. New York: American Medical Films, Incorporated. 10½" × 7½", pp. 500, with 428 illustrations. Price: $10.00.

An attempt to determine the effect of the inhalation of dust on the lungs of man in an effort to ascertain the quantity and quality sufficiently detrimental to interfere with the work or pleasure of the subject.

"A Short Practice of Surgery", by Hamilton Bailey, F.R.C.S. (England), F.A.C.S., F.I.C.S., F.R.S.E., and R. J. McNeill Love, M.S. (London), F.R.C.S. (England), F.A.C.S., F.I.C.S.; Eighth Edition; Part Four; 1949. London: H. K. Lewis and Company, Limited. 8¾" × 5¾", pp. 196, with illustrations, some of them coloured. Price: £2 12s. 6d. the set. Not sold separately.

Deals with the head, spine, nerves, special nerves, breast, thorax, larynx and infections of the hand.

"Textbook of Medical Treatment", by various authors, edited by D. M. Dunlop, B.A. (Oxon), M.D., F.R.C.P. (Edinburgh), F.R.C.P. (London), L. S. P. Davidson, B.A. (Cambridge), M.D., F.R.C.P. (Edinburgh), F.R.C.P. (London), M.D. (Oslo), and J. W. McNee, D.S.O., D.Sc., M.D. (Glasgow), F.R.C.P. (Edinburgh), F.R.C.P. (London); Fifth Edition; 1949. Edinburgh: E. and S. Livingstone, Limited. 9" × 6", pp. 1020, with 40 illustrations. Price: 35s.

"Explicit in regard to treatment recommended", this book is intended for students and practitioners.

"Introductory Botany", by Alexander Nelson, B.Sc. (Glasgow), Ph.D., D.Sc. (Edinburgh); 1949. Edinburgh: E. and S. Livingstone, Limited. 8½" × 5½", pp. 492, with 121 illustrations. Price: 22s. 6d.

An attempt "to meet the requirements of a student desirous of passing a first examination in Botany".

"The Renal Origin of Hypertension", by Harry Goldblatt, M.D., C.M.; Publication Number 14 of the American Lecture Series, edited by Paul R. Cannon, M.D.; 1948. Springfield: Charles C. Thomas. 9" × 5¾", pp. 140, with 38 illustrations. Price: 15s.

Sets out present-day knowledge of human and experimental hypertension.

"The 1948 Year Book of Obstetrics and Gynecology", edited by J. P. Greenhill, B.S., M.D., F.A.C.S.; 1948. Chicago: The Year Book Publishers, Incorporated. 7" × 4½", pp. 612, with 111 illustrations. Price: $4.50.

One of the "Practical Medicine Series" of year books.

The Medical Journal of Australia

SATURDAY, APRIL 30, 1949.

All articles submitted for publication in this journal should be typed with double or treble spacing. Carbon copies should not be sent. Authors are requested to avoid the use of abbreviations and not to underline either words or phrases.

References to articles and books should be carefully checked. In a reference the following information should be given without abbreviation: initials of author, surname of author, full title of article, name of journal, volume, full date (month, day and year), number of the first page of the article. If a reference is made to an abstract of a paper, the name of the original journal, together with that of the journal in which the abstract has appeared, should be given with full date in each instance.

Authors who are not accustomed to preparing drawings or photographic prints for reproduction are invited to seek the advice of the Editor.

A CAT OUT OF THE MINISTERIAL BAG.

RIGHT through the discussions that have taken place between the Commonwealth Government and the medical profession, as represented by the Federal Council of the British Medical Association in Australia, on *The Pharmaceutical Benefits Act* and the *National Health Service Act*, Ministers have asked the members of the profession to believe that there will be no interference with the bond of secrecy between the patient and his doctor—in other words, that the doctor-patient relationship will be inviolate. This suggestion is put forward in spite of the fact that when these acts were in force medical practitioners would have to keep records and these records would be open to inspection by officials, and, further, prescriptions bearing a patient's name and address would be sent to a government department. We know that, however well-intentioned Ministers may be when they make statements such as those mentioned, they are not always personally responsible for what may happen later on. In addition, recent happenings at Canberra are so deplorable and so disturbing that no public credence can possibly be given to any assurances from the Government that the personal and private rights of any person will be respected.

The incident occurred in the House of Representatives at Canberra when the Honourable A. A. Calwell, Minister for Immigration, was asked a question about the issuing of a passport to an Australian soldier who had recently come from Japan and wished to return there. The soldier's name was given in full. When the Minister had pointed out that the passport would be issued, but that permission for the soldier's admission to Japan rested with General MacArthur, another Member asked the Honourable C. Chambers, Minister for the Army, whether he would make a statement to the House because the soldier was reported to be backing up his request to the Government with a petition and the Member did not wish well-meaning people to be deceived. Mr. Chambers replied that he would ask for the leave of the House later on in the week to make a statement in order to let the people of Australia know just what sort of a man the soldier was. This was on March 8, 1949. On March 10, 1949, the Minister (Mr. Chambers) gave the House particulars of the soldier's service, taken from his official army record. He also gave a list of military offences with which the soldier had been charged and of which he had been found guilty in 1943, 1945, 1946 and 1947. He also stated six charges for which the soldier had been brought before a court martial in Japan. The Minister then went on to say that the soldier had stated that he wished to return to Japan to his wife. The army authorities had advised the Minister that no marriage ceremony of any kind had been performed and that the girl had stated that the soldier had promised to return and marry her. The Minister concluded his remarks with the statement that during his service in Japan the soldier had been on more than one occasion admitted to hospital suffering from venereal disease which he had contracted as a result of his own misconduct.

This action of the Minister will be resented by every fair-minded person in the community. The military offences had been promulgated among the troops—sentences are generally published in the "orders" of a unit. But once the soldier became a patient in a hospital he was entitled to all the privacy that a hospital could give him. The records of the hospital were in the keeping of a government department, as will be certain facts connected with the administration of *The Pharmaceutical Benefits Act* and the *National Health Service Act*. A Minister of the Crown has seen fit to relate under the privilege of Parliament facts which he should have kept secret—facts relating to the health of an individual in a government hospital. That the patient had been found guilty of serious military offences is not a mitigating circumstance. The medical profession and the public will be quite justified if they refuse to accept ministerial statements about what will be done and what will not be done in the administration of pharmaceutical benefits and a national health service. The community is really grateful to Mr. Chambers for having shown them what can happen when a third party comes between the doctor and his patient.

SMELLS.

THE world is a medley of smells; and every man carries his own bouquet of personal odours. Fortunately his obtuse olfactory sense is insensitive to most of them and they are wasted in the vitiated air he breathes. For of all man's facial furniture the nose is perhaps the most useless. That its bulbousness is likely to provoke comedy or its length incline to inquisitiveness, may not be denied; but, nevertheless, as an organ of smell it has fallen upon evil days. In its hey-day it was an organ of delight or disgust, bringing ravishment or revulsion to its primitive possessor; it was a blind but alert sentinel associated with the body's defence. Now it is a broken-down brave impotently sniffing the sentient air. It no longer guards its owner against danger in the winds of hostility; nor does it quiver at the approach of sensual delight. It has become a second-rate sense organ, as likely as not dulled by chronic catarrh when not already desensitized by cigarette smoke. It may at times supply some mute embellishment to the countenance, but very often it fails in this simple

service to beauty and renders the face a freckled caricature or an ugly deformity. A man may sniff his food with relish when it is freshly flavoured or turn up his nose at the garbage tin when it is rank. He may poke his proboscis into another man's business, but not generally in the spirit of an olfactory adventure. He is, in fact, singularly apathetic in his scholarship of smells. Unlike the dog he receives no surprise from the post and the tree holds for him no fascination. The scent evades him and he is impervious to the whiff. He is often led by the nose to his own despite, though the hand that guides him is invisible. In his simplicity he sometimes pays through the nose; and such is his perversity that he may keep his nose to the grindstone or, in a black moment, may cut it off to spite his face. These are human antics and have little to do with the sense of smell, which the years have debased and the habits made paltry.

There is no subtlety in a man's own smell. He lives with it and accepts it. But the exhalations of other people's bodies may disturb him in various ways. He may deplore his housekeeper's heavy breath, yet find the cheeks of his lover like a bed of spices. Theoretically, different races may be recognized by their odours. Primitive people have the greater olfactory perception, though some civilized folk are said to be able to recognize their friends by their smells. History accords a sweet perfume to Alexander the Great, but asserts that Thais, his celebrated courtesan, was the victim of an insupportable odour. Walt Whitman was the source of an agreeable smell, and likewise, the bodies of Malherbe and Haller were said to diffuse a pleasant perfume. Holiness was once associated with a desirable odour, and some of the most holy men in the Middle Ages were noted for their fragrant smell. This is apart from the odour of sanctity which permeated the persons of the saints particularly when nearing death. Coming from the meritorious to the mundane, breast-fed babies are said to smell like butyric acid and the odour of the aged is like that of dried leaves. Darkly pigmented people are said to smell like prussic acid while the odour of blondes is that of musk. Medical literature contains the report of a woman who smelt of vanilla; and menstruating women sometimes exhale a specific odour which is capable of recognition by those of nimble perception. But the man with the greatest sense of olfactory discrimination was surely that celebrated Hungarian monk who had claimed that he could smell chastity.

Modern medicine makes little demand upon the doctor's sense of taste. Diagnosis is never dependent upon it; neither is it made the criterion of treatment, though the flavour of a potion may prevail upon the patient. Likewise, the physician of today is seldom called upon to use his nose as a diagnostic acid, although the bedchamber has a variety of odours and the sick ward is often redolent with smells. When his diagnostic equipment was more limited reliance upon the evidence of the senses was greater and a special olfactory acuity was developed to distinguish certain diseases. Doctors of the older school, like Sir William Gull, claimed to be able to detect syphilis by its smell. Lunatics were believed to possess a specific odour, and medical men were willing to certify as insane those of their patients whose bodies exhaled this odour which was said to resemble that of mice. Typhus was also accredited with having a mouse-like odour, while the smell of typhoid was said to have a certain resemblance to blood. The old family doctor, examining the rash of a febrile patient, diagnosed measles if he smelt the odour of freshly plucked feathers, or scarlatina if the odour reminded him of hot baked bread. Other ailments had their characteristic smells. Gout and jaundice were known by their odour. Plague-stricken patients were thought to give off the odour of honey, while those suffering from eczema and impetigo smelt of mould. Old bed-ridden patients had an ammoniacal odour; and the breath of the diabetic savoured of apples. Special odours were associated with those suffering from diseases of the nervous system. A choreic female, for instance, is reported whose perspiration resembled the smell of pineapples; and an hypochondriacal male is said to have smelt of violets. The offensive odour of feet has been vividly described; but medical literature contains the report of an infantry captain the upper part of whose body emitted the vilest of odours which, like the hand of Lady Macbeth, could not be sweetened by all the perfumes of Arabia.

The modern oto-rhinologist is no longer interested in the odours of the body, but in the alterations of the sense of smell as an indication of some pathological change in the olfactory nerves or their cortical connexions which will ultimately invoke the neurologist. Lesions in the region of the cribriform plate, syphilis, meningitis or tumour, may cause a diminution or absence of smell; and certain tumours involving the uncinate gyrus may give rise to powerful olfactory hallucinations. Hysterical anosmia, a psychogenic conversion phenomenon, interests the psychiatrist who is familiar with those hallucinations of smell, frequently sexually conditioned and evinced by certain psychotics. Otherwise the smell has lost its significance in medicine. The surgeon's olfactory powers are not nowadays called upon to judge the laudability or otherwise of pus issuing from a surgical wound. Pus may put him to shame; but a stench by any other name is just as unpleasant, and in days gone by was thought to cause abortion. The same dead flies may cause the ointment of the apothecary to send forth a stinking savour, as they did in the days of the Preacher; but a deodorant in time will render the air sweet. Halitosis may worry the courting young man and hyperidrosis of the axillæ may baffle the sensitive young woman; but the doctor regards these discomforts as beneath his notice and, with his mind on higher things, brushes them aside and leaves them to the patent-vendor and the quack advertiser.

Some smells are shameful. They offend the nice sentiments of civilized man, especially if, through emotional association, they are concerned with sex. The goaty smell of venery, for instance, is one which seldom finds conscious expression. The odours of the human body are by common consent largely disregarded or camouflaged by the application of artificial perfume. Men and women are sensitive about the odours of the person and refrain, in the interests of good taste, from exploring this olfactory bazaar. Animals, on the other hand, exhibit a greater curiosity. The dog, for instance, is a veritable connoisseur of smells, and eagerly sniffs other members of the species in a manner which breeds a familiarity beyond canine contempt. Animal reactions to odours are patently honest

and without shame, while human reactions are hidden by the mask of pretended indifference or dissembled by a superior smirk. Nevertheless smell still plays a part in human sexual selection. Its importance may be small, but is far from negligible. It exists in certain intimate associations, heightening pleasure or stultifying romance according to personal idiosyncrasy. Men and women do not greet each other in the native fashion by rubbing their noses together; nor does the man of today draw the woman's hand to his nose in salutation. But in the embrace of the dance and in moments of proximate tenderness the magic aroma of desire caresses the senses and augments the feelings. It has been said that perfume imparts energy to passion. Modern man with his atrophied olfactory organ therefore expects women to use perfume to arouse his senses. For, though in the body's toilet the best perfume is no perfume, usage has largely sanctioned the judicious application of an accredited aphrodisiac so that the members may be made more memorable at the feast of the senses. On the other hand, olfactory antipathies are not unknown, although they most often arise from association with an object unpleasant for other reasons. Generally speaking, neurotics are most sensitive to the vagaries of smells. Inverts are often powerfully affected by certain odours; and from time to time the apparently normal individual displays an increased olfactory sensitivity and experiences sensations which are denied to the majority. Happy marriage may therefore hinge upon a nice congruity of odours; and many unions have been ruined by the presence of an unpleasant smell. Sharp words and hard faces across the breakfast table may play a major part in severing the marriage ties, but other factors not usually referred to are not without their shattering influence. Nor is it known how often romance, born of a plenitude of agreeable associations, may eventually be soured by a smell.

The correlation between the nose and the genitals was recognized in ancient times, although at present it seems to excite no interest. It was believed that defective sexual development went hand in hand with a corresponding olfactory defect; that operations involving the olfactory nerves caused testicular atrophy. It is on record that a woman exhibited hyponosmia following a double oophorectomy and that a man born without olfactory nerves showed defective genital development also. The impotent are alleged to display a dislike for sexual odours, and eunuchs are said to have less body odour than normal men. The size of the nose was thought to indicate the magnitude of the genitals; for, as Ovid remarked, "*Noscitare e naso quanta sit hasta viro*". Prostitutes and loose women of the Middle Ages who accepted this dictum were often crestfallen, though it figured in the ribaldry of the times. The scent of musk has long been associated with the production of venery, and so sexually provocative is this odour that Esquirol reported cases in which lactating women, smelling musk, became maniacal. Conversely, sexual activity was believed to cause nasal disturbances in certain sensitive people. Increased nasal secretion has occasionally been observed to follow intercourse and the so-called "bride's cold" may have been brought about by strong sexual excitement.

Poets are particularly susceptible to odours. Solomon, the most sensual of them, composed a canticle of the body's delights. Shakespeare, Milton and Shelley displayed a special interest in ravishing odours. Herrick found that "Hands and thighs and legs are all richly aromatical", and often allowed his nose to influence his verse. Rupert Brooke was quick-scented to a degree. Baudelaire's emotional life was powerfully provoked by the smells that assailed him; and Goethe once carried about the bodice of Frau von Steins so that he might remember her perfume. Men and women of exquisite sensibility have reacted to the power of smell, sometimes making a fetish of some particular odour. Some of the novelists have given licence to their noses and translated living odours into prose. Casanova found the bedroom of his beloved delightfully balsamic. Even Mohammed is said to have liked our world for its women and its perfumes. With the average civilized human being, however, smelling has become almost a lost art. He can no longer enjoy the riot of smells which drift past his nostrils. His nose is without nuance. He scarcely discriminates the diffused odours of the day and is largely unmoved by the fragrance of the night. Only the smell of gasolene and burnt oil or the concentrated essence of the scent bottle incites his jaded senses. The human avenue of olfactory exploration is closing up. Other faculties must be employed. In a world as fraught with menace as this world is today, where the babel of foreign tongues adds deception and misunderstanding to threat and fear, and where men, so well-meaning, yet so prejudiced, are seeking for the hidden pathways of peace, it is hoped that though olfaction is blunted, vision may be sharpened and men may see beyond their noses.

Current Comment.

CARCINOMA OF THE CERVIX UTERI.

INDIVIDUAL opinions still vary as to the relative values of radical surgery and radiotherapy in the management of carcinoma of the uterine cervix, as they do in relation to many other malignant conditions. A good deal of the conflict arises from the false system of putting the two modes of treatment into separate and opposing camps, but even those who seek to make the most of both methods are not all of one mind. A useful contribution to the discussion was made by Charles D. Read, of the Chelsea Hospital for Women in London, in a paper[1] which he read to the New York Obstetrical Society last year. Coming from the hospital of Bland Sutton, Comyns Berkeley and Victor Bonney, Read not surprisingly approaches the problem from the surgeon's point of view; but he shows no disposition to prejudice against radiotherapy. He first of all analyses the results obtained by Bonney with radical abdominal hysterectomy in 500 cases of carcinoma of the cervix between 1907 and 1936, and compares them with the results of treatment by radiotherapy. His resultant comment is that even the most biased surgical enthusiast must admit that over all the results of radiotherapy are superior to those of surgery in respect of operative mortality and possibly survival rate. But the problem does not rest there, and Read asks two important questions. Can we salvage the lives of any of those patients destined to die even after adequate radiotherapy? Is it ever desirable to employ surgical measures without previous radiotherapy? In pursuit of the answers Read considers operative mortality rates. During the twelve years prior to 1948, at the Chelsea Hospital for

[1] *American Journal of Obstetrics and Gynecology*, December, 1948.

Women, radical operation was performed on 96 patients with an operative mortality rate of 8·3% and an operability rate of 14%. In their combined results Read and a colleague, Frank Cook, had an operative mortality rate of 3% in 207 Wertheim hysterectomies performed in public hospital and private practice, and he considers that the operative mortality rate among properly selected patients should not exceed 5%. In his view the present indications for Wertheim hysterectomy for carcinoma of the cervix are radioresistant growths proved to be such either clinically or cytologically, columnar-celled carcinoma of the cervix, stenosis of the vaginal vault, the presence of large fibroid tumours or ovarian cysts complicating cervical cancer, salpingitis complicating cervical cancer, refusal of irradiation by the patient, and pregnancy complicating cervical cancer. He feels that it is obvious that treatment by radium alone by means of vaginal applicators can never hope to give adequate irradiation to the lymphatic field of the pelvis, and the efficiency of deep X-ray therapy in this respect is questioned. There is a place for lymphadenectomy in selected cases of stage III growths cured locally by radium, and this may be extended to include those in stage II and selected cases in stage I. In recent years, Read states, radical surgery for carcinoma of the cervix has tended to be underrated in its usefulness, but, while he emphatically agrees that in the present state of our knowledge the routine treatment of election in the average case is radiotherapy, in certain selected cases surgery offers the best prospect for the patient; the absolute cure rate can be increased by a surgical approach to those growths which prove to be radioresistant or for which adequate irradiation is not possible.

Further light is thrown on the two questions asked by Read by the work of Alfred Glucksmann and Stanley Way,[1] who used a cell-count technique, introduced by Glucksmann, of determining whether or not the response of a tumour to radiotherapy was favourable. This appeared to offer a rational basis of selection of patients who would be unsuitable for treatment with radiotherapy alone and to aid the attempt to salvage by surgery as many patients with radio-incurable tumours as possible. Among 149 patients studied the tumour yielded in 54 cases a favourable or probably favourable response to radium treatment and in 88 an unfavourable response, as based on serial biopsies obtained before and during irradiation. Routine treatment consists of examination under anæsthesia, "staging" and assessment of the tumour, preliminary biopsy, and the first application of radium. A week later a second biopsy is taken and the second application of radium is given. During the following two weeks the histological analysis is made and the prognosis is obtained. If the prognosis is favourable the third application of radium is given, followed two weeks later by bilateral iliac adenectomy in some cases. If the prognosis is unfavourable and the condition is suitable for radical surgery, no further radium is given and operation is performed six weeks later. If the prognosis is unfavourable and the tumour is inoperable, a further application of radium is given, but iliac adenectomy is not performed. The histological analysis is made by counting the resting cells, mitotic cells, differentiating cells and degenerating cells. In cases in which tumours fail to respond to irradiation the histological picture before and after exposure to radium is approximately the same. A favourable prognosis holds only for the fully treated local lesion. It has been found that the differentiated types of cervical carcinoma tend to respond favourably in a greater proportion of cases than do the anaplastic types. The capacity to increase in extent and degree of differentiation distinguishes the radio-curable from the radio-incurable tumours. The estimated operability rate among the 88 patients with an unfavourable response to radiotherapy was 52%, but was reduced to 26%. Wertheim's hysterectomy was performed on 28 patients, the operation had to be abandoned for various reasons in 10 cases, and the operation was not attempted in eight cases. Lymph gland involvement was present in 25 of 37 cases in which material was available for section. Assessment three to twenty months after treatment shows that the condition of 68% of the surgically treated patients is satisfactory, while that of only 41% of those not treated surgically is satisfactory. Glucksmann and Way consider that, provided the tumour is of the type that responds to radiotherapy, and provided it is of such an extent that every part of it can be adequately irradiated, radium can achieve more in the cure of the primary tumour than Wertheim's operation and with less risk. If the first of these conditions is not fulfilled surgery offers the only hope of saving the patient. If the second condition cannot be fulfilled a combination of radium therapy and surgery gives the best result. It is unjustifiable to submit a patient to surgery without first determining the response of the tumour to irradiation—an unequivocal answer to Read's second question.

[1] *The Journal of Obstetrics and Gynæcology of the British Empire*, October, 1948.

THE ANAMNESIS.

IT is probably safe to say that most practitioners would be a little nonplussed if asked their views on the anamnesis—it sounds very much like something that should be the psychiatrist's prerogative—but the medical dictionary gives it no higher status than "the act of remembering" and, "in particular", "the medical history of a patient previous to his present illness". The Oxford Dictionary accords with this, and as an illustration quotes words written in 1657 by one J. Smith [*sic*]:

> Anamnesis is a figure whereby the speaker, calling to mind things past, whether of sorrow, joy, &c, doth make recital of them.

So the anamnesis is the familiar friend of all doctors, a useful and necessary servant who should be given plenty of work to do, but never allowed to get out of hand. Many errors have been made in diagnosis because of history taking that was deficient in either quantity or quality; on the other hand the recommendations of some manuals designed to instruct medical students would make it a burden to the flesh and a confusion to the mind. Sir Adolphe Abrahams put forward some wise comments on the subject in his presidential address delivered to the Section of Medicine of the Royal Society of Medicine[1] last year. He first of all makes it quite clear that he appreciates the value of sound history-taking and gently deprecates the modern student's "insatiable appetite" for laboratory investigations and other adventitious aids to diagnosis, though he is sympathetic to the desire to find short cuts in this age of hustle. His discerning comment is, however, that the securing of the patient's confidence and the taking of a useful history are part of the art of medicine in distinction from the science. It often takes much experience to learn to appreciate the patient's point of view and to tolerate the seeming irrelevancies and deficiencies of the story he offers. Much can be learnt from the small points. Having clarified this part of his attitude, Abrahams proceeds to join issue with those who lay undue stress on the history and tilts at a dermatologist who has published his experience of deliberately averting his eyes from patients to test his ability to diagnose from the description of the symptoms. We may admire the skill of an expert and accept as a *tour de force* such self-imposed limitations, states Abrahams,

> but by these I am reminded of freak competitions, such as playing golf in boxing gloves, or billiards with an umbrella stripped of a ferrule, or cricket left-handed with a broomstick. With these analogies before us we might issue an invitation or, shall I say, a challenge to examine a patient blindfold or with the ears tightly plugged with cotton-wool. There are occasions when interrogation is of supreme importance, but it is not necessary for its appreciation to deprive oneself of other assistance.

Unnecessary talking is wearisome to the interrogator and may alienate the patient. In particular it is a waste of time to cross-examine on the details of something which will be settled by brief examination. Abrahams is particularly critical of a rigid routine in relation to the

[1] *The Lancet*, April 2, 1949.

family history and pleads the right of the student to be allowed the exercise of a little discretion provided that he appreciates the information of real value that can be obtained. In the personal history he sees more need for care and discernment especially in finding clues to ætiology and the hidden factors in obscure conditions that the present fashion delights to consider under the term psychosomatic medicine. In certain circumstances "history-taking demands the finesse of a diplomat with the sympathy of a father-confessor in the understanding that the sorrow that has no vent in tears makes other organs weep". The danger to be avoided is, of course, the attributing to psychological causes of symptoms that have a straightforward organic basis. In his concluding remarks Abrahams, after discussing in some detail the value of minute examination of certain symptoms and circumstances, warns that in the phraseology of a sister profession, medical history may be regarded as circumstantial evidence; we are rarely provided with obvious clues, still more seldom with the opportunity to convict *in flagrante delicto*. In this respect the examining physician is judge, jury and prosecuting and defending counsel all in one. The point that must be borne in mind is that "circumstantial evidence, however approbated, may well be fallacious". The solution seems to lie in the very old system of the application of common sense.

PENICILLIN AND FINGER-PULP INFECTIONS.

AMONG the various types of serious hand infections, those involving the terminal pulp compartment of the finger are comparatively minor, but they can cause a good deal of pain and inconvenience, waste working time and leave a deformity that will cause serious handicap in many cases. S. H. Harrison, E. Topley and J. Lennard-Jones[1] have recently reported the results of a controlled investigation in 169 cases of finger-pulp infection in which penicillin was administered systemically. They were concerned with the value of systemic administration of penicillin for hand infections generally, but considered that finger-pulp infections were suitable clinical material for investigation purposes because some 90% of them are due to penicillin-sensitive *Staphylococcus aureus*, because the surgical pathology can be defined at operation, and because the lesion, while being one of the commonest forms of sepsis taking more than a fortnight to heal, is mild enough for there to be no moral obligation to give penicillin as a routine measure, until its value is fully proved. Patients were allotted for treatment with penicillin or to a control group by the method of random selection. In all cases they received the optimal associated treatment. The broad finding was that patients receiving systemic treatment with penicillin enjoyed a significant reduction in healing time (a mean of six days) and in complication rate; the reduction was not dramatic in extent, but sufficient to warrant the form of treatment as a routine measure. Comparable results were not obtained with the local use of penicillin. The significant results were obtained in relation to subcutaneous finger-pulp infections; the results with the type classed as intracutaneous infections were not conclusive, but it is suggested that as it is impossible always to differentiate the two types of infection before operation, there is something to be said for a single pre-operative injection of penicillin followed by a further course if the pulp tissue is found to be involved. The associated treatment was altered as the investigation continued. It is suggested that the improvements in results which occurred were in part due to the making of a minimal incision over the area of greatest tenderness. An atraumatic incision technique is described, and, though it is admitted that its superiority over the lateral J-shaped incision has not been shown by a controlled trial, the evidence points that way. Harrison and his colleagues consider it clinically unjustifiable to continue the use of the lateral J-shaped incision except possibly in a controlled trial designed to assess its value. Daily observations were made on fingers not incised, an ingenious method of water-displacement (designed by Lennard-Jones) being used to estimate the finger-volume. By this means patients were divided on admission to hospital into those whose fingers were swollen more or less than 10%. The finger swollen less than 10% often did not require operation. The finger swollen more than 10% generally required operation in spite of penicillin, and the evidence indicated that, even when penicillin is given systemically, delay in operation after the finger is swollen 20% is harmful to the patient. In the treatment of the swollen finger it is therefore unlikely that incision will be avoided, however long the delay. These investigations need considerable extension before the results can be regarded as quite conclusive and certainly before they can be regarded as a pattern by which to plan the treatment of more serious hand infections, but they are a valuable contribution to the study of an important practical problem.

[1] *The Lancet*, March 12, 1949.

"BENADRYL" IN THE TREATMENT OF PARKINSONISM.

PARKINSONISM is a distressing condition and its treatment is unsatisfactory. It was inevitable that sooner or later someone should decide to treat one of its subjects with the currently fashionable "Benadryl" without necessarily expecting to effect much. However, the results reported by G. M. S. Ryan and J. S. Wood[1] in the treatment of 40 patients with parkinsonism are striking and should be widely known. In every case some benefit was derived and in some cases the effect was dramatic. In an analysis of their results Ryan and Wood state that rigidity was consistently lessened. The relaxation achieved was accompanied by improvement in spontaneous movement, in the gait, and in the clarity of speech. In three cases the patients were able to undertake light work after a period of unemployment of two years or more. All of the patients with rigidity who were previously unable to wash and dress themselves became able to do so. The improvement in speech was most striking. Tremor responded on the whole poorly. In early cases, in which tremor was limited to one part, for example, a limb, there was considerable improvement, but in most cases, especially when the tremor was at all severe or was generalized, no benefit was obtained. Akinesia, when unaccompanied by rigidity, was invariably aggravated. Oculogyric crises, with one exception, did not respond. Muscular cramp was abolished within a few hours of the starting of treatment. The best results have been achieved by giving "Benadryl" 50 milligrammes three or four times daily. Within ten days the therapeutic effect reaches its maximum, and thereafter increase in dosage cannot be expected to produce further improvement. Physiotherapy and rehabilitation exercises are useful when the greatest relaxation has been attained, and the classical forms of treatment may be continued concurrently; indeed, the sudden withdrawal of the patient's usual treatment may be very unwise and disturbing to him. Side effects and evidence of toxicity have been lacking with the one exception that about one-third of the patients experienced somnolence for the first fourteen days or so; this was in no case serious and was easily counteracted with amphetamine, five milligrammes, given in the morning. It is particularly interesting to note that the administration of capsules which the patients did not know to be dummies led to immediate relapse in all cases, so that the effect of suggestion can be neglected. Ryan and Wood make it clear that "Benadryl" does not cure parkinsonism; its effect is purely palliative, and complete relapse occurs within forty-eight hours of withdrawal. The patients are still unmistakably suffering from parkinsonism, but the beneficial effects are very real and in two cases have persisted for over eighteen months—the longest period for which treatment has been carried on. These results seem to be quite straightforward and open to little criticism. They are at least subject to immediate verification by every physician and general practitioner who has a subject of parkinsonism amongst his patients.

[1] *The Lancet*, February 12, 1949.

Abstracts from Medical Literature.

MEDICINE.

Congenital Heart Disease.

GORDON MURRAY (*The Canadian Medical Association Journal*, January, 1948) discusses the treatment of congenital heart disease, and reviews the results in a series of 62 cases in which he performed surgical operations. The probabilities are that about 75% of cases of congenital heart disease with cyanosis are due to the tetralogy of Fallot. The opinion of Taussig and Blalock, that these congenital defects may be related to changes in the mother's health during the first three months of pregnancy, for example, German measles, is quoted. The clinical syndrome is characterized by persistent cyanosis from birth, a systolic cardiac murmur over the pulmonary area, pronounced clubbing of the fingers and toes, and extreme limitation of exercise tolerance. Clinical investigation reveals polycythæmia with increased hæmoglobin content of the blood, and a diminished oxygen saturation, perhaps as low as 30%, of the external blood. Amongst those patients with an oxygen saturation of 60% to 70% the exercise tolerance is somewhat better, and above this level the patient would not come under the classification of "blue baby" because cyanosis would not be evident. The cardiogram of these patients shows a right axis deviation and skiagrams of the chest reveal cardiac enlargement. In the author's series there were 41 cases of tetralogy of Fallot, 12 cases of patent *ductus arteriosus*, and nine others, with an over-all mortality of 11·3% and a mortality of 7·3% among patients with the tetralogy. After operation the patients are nursed in oxygen tents for a few days, and if a satisfactory anastomosis has been performed, their recovery is surprisingly smooth; the benefits of improved oxygen saturation are obvious usually within a matter of hours. All of the author's patients were given heparin postoperatively to aid in keeping the anastomosis patent.

Obesity and its Treatment, with Particular Reference to the Use of Anorexigenic Compounds.

R. H. WILLIAMS, W. H. DAUGHADAY, W. F. ROGERS, S. P. ASPER AND B. T. TOWERY (*Annals of Internal Medicine*, September, 1948) state that pronounced obesity interferes seriously with the health and happiness of a vast number of individuals; this should be clarified in the minds of obese subjects and their desire to take adequate therapy stimulated. Obesity is a condition of positive energy balance, but the factors which contribute to this imbalance, whether emotional, environmental *et cetera*, should be sought and corrected as far as possible. The patient should have his daily ingestion of food restricted sufficiently to lose the desired amount of weight. If these objectives are not obtained compounds of the aminopropane type may help as adjunctive therapy, chiefly through their anorexigenic effect; their use alone does not cause sufficient loss of weight in most subjects. The authors used eight aminopropane compounds in the treatment of 132 very obese patients. Response to the different compounds and even to the same compound in the same individual was variable, and a variable degree of refractoriness was found to develop. All of the compounds used had good effects or bad effects, or both, in most of the patients. Good effects were anorexia, increased mental and physical activity, a sense of well-being and increased ambition. Undesirable effects were restlessness, apprehension, depression, irritability, insomnia, exhaustion, headache, dizziness, unpleasant taste, halitosis, burning in the throat, dryness of the mouth, heartburn, nausea, vomiting and increased frequency of bowel movement. By appropriate regulation of dose most of the patients were made to lose a significant amount of weight without the ill effects of the compound being very prominent. The most desirable drugs are listed in order of preference. For some patients it is not necessary to use drug therapy for more than a few weeks, as the patient becomes adjusted sufficiently well to continue the regimen without it. With prolonged administration there must be interspersed periods of from two to four weeks with no anorexigenic drugs. When a state of moderate refractoriness has developed another one of the compounds should be used. The first compound can later be used effectively. The good effects of this type of treatment greatly overbalance the ill effects when it is used continuously in selected cases.

Homologous Serum Hepatitis.

M. C. BLANCHARD *et alii* (*The Journal of the American Medical Association*, October 3, 1948) discuss methods of protection against homologous serum hepatitis. Of patients who receive blood transfusions, 7% may develop this complication. The virus of serum hepatitis and other viruses have been inactivated by ultra-violet rays. The authors investigated a serum pool which had produced hepatitis in 50% of inoculated volunteers. They submitted the serum to ultra-violet rays and then inoculated volunteers with irradiated serum and another series with non-irradiated serum. The first volunteers did not contract hepatitis, whereas the second series of volunteers did develop hepatitis with jaundice, to the number of three out of fifteen inoculated. The authors suggest the routine exposure to ultra-violet rays of serum and plasma which is to be used for transfusion.

The Surgical Treatment of Intravenous Clotting.

H. M. ELDER (*The Canadian Medical Association Journal*, October, 1948) discusses the surgical treatment of intravenous clotting. The ætiology of intravascular clotting is described, the pathology of the process is outlined and a sharp distinction is made between thrombophlebitis and phlebothrombosis, the former being mainly associated with acute inflammatory changes about and in the vein wall, where the clotting is of a very secondary nature, and the latter being a primary clotting of blood in the lumen of the vein with very little involvement of the vein wall. The best treatment of these conditions is prophylaxis. In many clinics the prophylactic use of anticoagulants is a routine measure in types of cases in which they are more liable to develop. Early post-operative ambulation has materially reduced the morbidity and mortality rates of pulmonary embolism. Conservative treatment, including the use of anticoagulants, is the method of choice for acute thrombophlebitis. "Novocain" block of the sympathetic ganglia controlling vasoconstriction in the affected limb is also advocated. Radical surgery is indicated only in the event of septic necrosis of the clot, with ligation of veins well above the affected area, even up to and including the inferior *vena cava* if necessary. The primary danger in phlebothrombosis is not to the limb, but to the life of the patient. There is no ischæmia and little vasospasm, but there is a great liability to formation of emboli, and treatment must be directed toward the prevention of a catastrophe. The treatment is therefore early and radical surgery. Phlebography may be carried out if there is doubt on clinical examination, and the vessel or vessels must be tied well above the thrombosis. Thrombectomy is futile *per se*. Attacks upon the saphenous vein, the superficial femoral vein, the common femoral vein and the iliac veins have been followed by ligation of the inferior *vena cava*, with gratifying results in the main. There has been a surprising absence of œdema once sufficient time has elapsed for the establishment of a collateral venous drainage system.

Dicoumarol.

S. W. COSGRIFF *et alii* (*The Journal of the American Medical Association*, October 9, 1948) discuss the ill effects of dicoumarol. Of persons who receive dicoumarol, 20% to 30% react abnormally, with an excessive elevation of prothrombin time and risk of hæmorrhage; 6% of patients have hæmorrhage, 1% or 2% serious hæmorrhage, and fatalities do occur. When the prothrombin time is excessively high, treatment with lyophilized plasma can be carried out. Transfusions of whole blood may or may not be successful in overcoming the effect of dicoumarol. If they are not successful, lyophilized plasma may be used; but this introduces a risk of homologous serum jaundice.

Personality Study at a Gastro-Intestinal Clinic.

H. R. KLEIN (*The American Journal of Psychiatry*, January, 1948) states that 100 patients who complained of nausea, vomiting, pain after meals, belching, fullness, loss of weight, constipation *et cetera*, were studied from four aspects: physical, psychometric and Rorschach, psychiatric and physiological fitness. Most characteristic of this group was that they were exceedingly unhappy, worried, thwarted and depressed individuals. A striking proportion came from broken homes and, with many more, emotional needs were inadequately met in childhood. It was found that 44% were first, only or last children. Few showed early fixation or poor health in childhood. In 63% of cases there was no specific pathological condition; in the remainder gastritis, duodenitis, peptic ulcer, gall-bladder disease and other gastro-intestinal conditions were present. Nausea was complained of by 22% of patients with no detectable physical abnormality; its incidence was negligible among those with a specific pathological condition — vomiting was twice as common with the latter as the former. Half of the patients were

dissatisfied with their work; the same number had conspicuous marital maladjustments; men were far more commonly affected than women. Precipitating factors were present in 30% of cases only. Arduous demanding work with complete lack of social life or recreation was common. Meagre finances and family ill health were also significant. Many patients were unaware of tension or stress or undue concern. The variety of character structure was multiple and did not conform to any personality type as suggested by some observers.

Hypertension and Thiocyanate Therapy.

D. L. KESSLER AND L. E. HINES (*The Journal of the American Medical Association*, October 23, 1948) publish reports of three patients who developed serious toxic effects following the administration of potassium thiocyanate. In one patient with a blood thiocyanate level of 8·8 milligrammes *per centum*, severe mental confusion arose, which lasted eighteen days; at the end of that period the blood thiocyanate level was 5·5 milligrammes *per centum*. At this stage the blood pressure had fallen from 250 millimetres of mercury (systolic) and 150 millimetres (diastolic) to 235 millimetres of mercury (systolic) and 110 millimetres (diastolic). The second patient developed slurring of speech and failure of concentration after three weeks' treatment with 0·3 gramme of thiocyanate three times a day. Symptoms subsided in fourteen days. The blood pressure fell from 180 millimetres of mercury (systolic) and 90 millimetres (diastolic) to 140 millimetres of mercury (systolic) and 70 millimetres (diastolic). The third patient became drowsy and developed hallucinations and exfoliative dermatitis; these were followed by jaundice, pneumonia and death. The authors suggest that the hypotensive effect of thiocyanates may be due to their poisonous effect on liver cells.

The Treatment of Tuberculous Pleural Effusion.

O. DE MARÉ (*Acta tuberculosea Scandinavica*, 1948) has followed up for three years or more 371 patients suffering from tuberculous pleurisy with effusion, in order to throw light on the question whether replacement of the fluid with air and maintenance of artificial pneumothorax form a sound therapeutic procedure. It was found that about one patient in five develops pulmonary tuberculosis of a progressive type, but that only about one in ten develops the disease on the same side as the effusion. Pneumothorax treatment appeared to have no effect in preventing the subsequent development of progressive tuberculosis; but very often the treatment could not be applied or maintained. In 86 out of 138 patients in whom pneumothorax was established the treatment had to be abandoned within a year on account of adhesions or other complications. In only four patients was really effective collapse of the lung obtained. However, when there was a perceptible tuberculous focus in the lung on the same side as the effusion it seemed that the pneumothorax treatment was beneficial. Air replacement and pneumothorax treatment did not seem to affect the degree of pleural thickening which subsequently took place; this appeared to be related to the volume of the exudate. The induction of effective pneumothorax after the healing of pleurisy was never possible. Empyema seldom occurred, but the risk of its occurrence was much greater when pneumothorax treatment was carried out, especially when attempts were made to "work up" a partial pneumothorax. The author's conclusion is that the fluid need not be drawn off when its volume is not large enough to prevent an evaluation of the state of the underlying lung, but that larger effusions should be replaced with air. No further air is introduced unless X-ray and bacteriological examinations reveal the presence of active homolateral parenchymatous disease or great enlargement of the hilar lymph glands. These are indications for pneumothorax treatment, especially in the presence of high fever, massive effusion or rapid blood sedimentation, provided that an effective collapse of the lung can be obtained.

A Refinement of the Basal Metabolic Rate Determination.

A. DURUPT (*La Presse médicale*, August 14, 1948), writing from the central laboratory of the Hôpital Bichat, Paris, states that if the metabolic rate is determined under basal conditions and then immediately determined again after the subject has performed vigorous gymnastic exercises with the arms for three minutes, the result is normally found to be from 1% to 6% higher after exercise than at rest. In subjects with thyreoid overactivity the metabolic rate is more than 14% higher after exercise than at rest and increases proportionally with the activity of the thyreoid gland. In those with thyreoid deficiency the metabolic rate is lower after exercise than it is at rest. The author states that the determination of the effect of exercise upon the basal metabolism is a more accurate test of the functional state of the thyreoid gland than is the determination of the basal metabolism alone. Moreover, it is a test which is not subject to the fallacies which may be introduced into tests of the basal metabolism if the patient is insufficiently prepared or is menstruating; it is most valuable when the figure for the basal metabolism is difficult to reconcile with the clinical state of the patient, and also in determining the sufficiency or otherwise of treatment for thyreotoxicosis or myxœdema.

Post-Operative Pulmonary Infections.

G. V. TAPLIN *et alii* (*The Journal of the American Medical Association*, September 4, 1948) discuss the prevention of post-operative pulmonary infections by the use of penicillin or streptomycin aerosols. Examination of nasal swabbings and of sputum in 195 cases showed a variety of organisms, mainly *Streptococcus viridans* and other streptococci, but staphylococci, *Hæmophilus influenzæ*, *Escherichia coli*, *Neisseria catarrhalis*, diphtheroids, yeasts, pneumococci, Friedländer's bacillus, *Micrococcus tetragenus* and *Bacillus pyocyaneus* were recorded. Some of these organisms were penicillin-sensitive and some streptomycin-sensitive. The patients were treated with inhalations of penicillin or streptomycin for two days before and two days after operation. Some patients were treated by atomizer or with mist-type aerosols. The results were not so good as among patients treated by special insufflation apparatus, with the use of micropulverized penicillin or streptomycin. The results showed a considerable reduction of bacteria in the patients treated, and also a reduction in the respiratory complications.

The Treatment of Tetanus.

H. M. SMATHERS AND M. R. WEED (*Archives of Surgery*, September, 1948) review 82 cases of tetanus. Special attention is given to recent cases in which "Intocostrin" and d-tubocurarine in wax and oil were used in treatment. From this experience it is concluded that while "Intocostrin", which contains raw crude curare, is unsatisfactory in the routine treatment of tetanus, d-tubocurarine in wax and oil is effective in controlling tetanic spasms without undue hazard and may be a significant advance in the treatment of this disease. A plan of treatment is formulated.

Medications in Epileptiform Syndrome.

LORNE D. PROCTOR (*The American Journal of Psychiatry*, December, 1947) states that 130 patients presenting a syndrome including cranialgia, emotional instability, vasomotor instability, impaired consciousness, loss of consciousness, personality disorders and epilepsy, have been found to have a common electroencephalographic component, namely, half and double α variants. In 95% of the cases impaired states of consciousness occurred and in a significant proportion *grand mal* epileptic features. The series has shown a selective response to trials of several medications, improvement being produced in 90% of cases with "Dilantin Sodium". Phenobarbital or "Sodium Amytal" was of little benefit. It is suggested that this syndrome is more inclusive than those conditions variously described as psychomotor attacks, psychic variants or equivalents, or psychical seizures, and warrants the term epileptiform syndrome. The syndrome enlarges our conception of the limits of epilepsy.

New Penicillin.

N. ERCOLI *et alii* (*The Journal of the American Medical Association*, September, 1948) have described a new vehicle for parenteral penicillin therapy. It was shown that a combination of epinephrine (0·3 milligramme), crystalline potassium penicillin (300,000 units) and vegetable oil (one millilitre) was effective in treatment. The vegetable oil was fluid at ordinary room temperatures and did not require special syringes for injection. The mixture was injected intramuscularly. Epinephrine prolonged the effect of the penicillin. Intramuscular injection of 300,000 units with epinephrine gave a definite penicillin level in the blood for fifteen hours, as against seven hours for penicillin in saline solution in the same dosage. Subcutaneous injection of the epinephrine preparation gave more prolonged effects, and 150,000 units gave an appreciable blood penicillin level after fifteen hours. Of 100 patients, 97 were cured of gonorrhœa by one subcutaneous injection of 150,000 units of penicillin with 0·15 milligramme of epinephrine in 0·5 millilitre of vegetable oil. The preparation used was called "Intracillin".

Congresses.

THE AUSTRALIAN AND NEW ZEALAND ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

THE twenty-seventh meeting of the Australian and New Zealand Association for the Advancement of Science was held at Hobart from January 12 to 19, 1949, under the presidency of DR. A. B. WALKOM, Director of the Australian Museum in Sydney.

The Sections.

The sections represented were: *A*, Astronomy, Mathematics, Physics and Optometry; *B*, Chemistry; *C*, Geology; *D*, Zoology; *E*, History; *F*, Anthropology; *G*, Economics, Statistics and Social Science; *H*, Engineering and Architecture; *I* and *N* (combined for the twenty-seventh meeting), Medical Science, National Health and Physiology; *J*, Education, Psychology and Philosophy; *K*, Agriculture and Forestry; *L*, Veterinary Science; *M*, Botany; *O*, Pharmaceutical Science; *P*, Geography and Oceanography.

General Council Meeting.

At a general council meeting held in the House of Assembly, Hobart, on January 12, 1949, the Association accepted an invitation to hold its next meeting in Brisbane in May, 1950.[1]

Professor Sir Kerr Grant, of South Australia, was elected president-elect for the next meeting of the Association. Professor N. A. Burgess and Professor J. R. A. McMillan, of the University of Sydney, were reelected general secretary and treasurer respectively. The Mueller Memorial Medal was awarded to Professor W. J. Dakin, of the University of Sydney.

Reception of Delegates.

His Excellency the Governor of Tasmania, Admiral Sir Hugh Binney, K.C.B., D.S.O., received members of Congress at a garden party at Government House, Hobart, on Friday, January 14. The presidential reception was held in the grounds of the Wrest Point Hotel, Sandy Bay, on January 12. The Lord Mayor of Hobart entertained members of the General Council of the Association in the Hobart Town Hall. A reception by the Premier of Tasmania, the Honourable Robert Cosgrove, M.H.R., was held at Wrest Point Hotel on Tuesday, January 18.

Religious Services.

Special church services were held on the evening of Sunday, January 16, at Saint David's Anglican Cathedral and at the Baptist Tabernacle. At Saint David's Cathedral the service was conducted by the Very Reverend Fewtrell, Dean of Hobart, and the sermon was preached by Professor A. P. Elkin, of the University of Sydney.

Public Discussions.

On the evening of January 11 a public discussion on the place of the Australian National University in the academic structure of Australia was opened by Professor D. B. Copland, Vice-Chancellor of the Australian National University at Canberra. Other speakers were Professor Hugh K. Ward, Professor of Bacteriology, University of Sydney; Sir John Morris, Chief Justice of Tasmania and Chancellor of the University of Tasmania; Sir John Medley, Vice-Chancellor of the University of Melbourne; Professor Alan Burn, Vice-Chancellor of the University of Tasmania; Sir John Madsen, Professor of Electrical Engineering, University of Sydney. An open discussion followed.

A session on the social and international relations of science took the form of a public discussion on the question: "Is there a Scientific Approach to Problems of Human Conflict?" Addresses by Professor F. M. Burnet and Professor O. A. Oeser were followed by a general discussion. Sir John Morris, Chief Justice of Tasmania, was in the chair and gave a summing-up of the discussion.

Excursions.

Numerous excursions arranged for delegates to the congress included several general tours of Tasmania; a tour of the chemical industries of the north-west and west coasts, a tour of the principal hydro-electric schemes of Tasmania, and excursions to observe the geology, botany and forestry of various regions of the island. Marine biologists enjoyed a trip to the scallop dredging and fishing grounds of the Derwent estuary and D'Entrecasteaux Channel.

[1] It is understood that this date was subsequently altered because of the decision to hold the Seventh Session of the Australasian Medical Congress (British Medical Association) at Brisbane at the end of May, 1950.

Public Meetings.

David Memorial Lecture.

The second David Memorial Lecture was delivered by PROFESSOR A. P. ELKIN, professor of anthropology in the University of Sydney, who chose as his subject "Man and his Cultural Heritage".

Religion in Education.

On the evening of Friday, January 14, MR. P. H. B. LYON, former headmaster of Rugby, England, who was visiting Australia under the auspices of the British Council, gave an address entitled "Religion in Education".

Inaugural Meeting and Presidential Address.

The inaugural meeting was held in the City Hall on the evening of Wednesday, August 21. The president, DR. A. B. WALKOM, Director of the Australian Museum in Sydney, delivered his address on "Gondwanaland, a Problem in Palæography". Dr. Walkom dealt with the disposition in other ages of land masses on the globe and traced the changes which have occurred in past geological periods. In rocks laid down during the Permian Period, about 250 million years ago, a characteristic flora, known as the Glossopteris Flora, had a wide distribution over parts of South America, South Africa, India, Australia, and Antarctica. From studies of this flora and associated phenomena a number of hypotheses had been put forward—hypotheses which involved very different ideas as to the distribution of land and sea in the Permian Period. The four prominent hypotheses were: (i) The postulation by Edouard Suess of the existence of an extensive continent which included the continental areas mentioned above as well as the greater part of the South Atlantic and Indian Oceans. (ii) The suggestion by W. D. Matthew that the continental masses had been much as they were today and that they had been joined in the Arctic and/or Antarctic regions so that migration could take place in a general north-south direction. The term "continental mass" was used to include not only the land which now projected above sea-level, but also the areas covered by the comparatively shallow seas around the continental margins. It was generally agreed that there had been fluctuations in the level of the sea, as a result of which the extent of the exposed land masses had shown considerable variation. (iii) The thesis that the continental masses had been substantially as they were today, but that they had been joined by isthmian links which had allowed migration of faunas and floras in an east-west direction advocated by C. Schuchert and Bailey Willis. (iv) The hypothesis put forward by A. Wegener, that originally there had been but one land mass, which, at some time in the Mesozoic Era, had begun to break up; the parts had drifted away from one another until they reached their present relative positions, which of course were not final, as the drifting was supposed to be still in progress. This hypothesis envisaged shifting of the poles, which during the Permian Period were shown to be as much as 2500 miles from their present positions.

Each of these proposed solutions of the problem of the distribution of the land masses in the Permian Period raised difficulties, but studies of the fossil plants seemed to lend most supoprt to the former existence of land bridges, or "isthmian links" between the continental masses.

The Field of Physics in Medicine.

In his presidential address to Section *A*, DR. C. E. EDDY (Melbourne), physicist in charge of the Commonwealth X-Ray and Radium Laboratory in Melbourne, spoke of the growing applications of physical knowledge in the field of medicine. He referred to X rays, radium and the various visual and aural aids. Recently, radioactive isotopes produced in great quantities in atomic piles had given medicine a new tool in the diagnosis of many diseases.

Physics played an important part in the pre-clinical education of the medical student. Although, in general, special courses in physics (rather than those for the science and engineering undergraduate) had been designed for medical students, they were not always proving successful in providing the necessary background. In some universities additional tuition in special aspects of physics was given to the medical student in his hospital years, when he was more able to appreciate the need for physical knowledge.

Very special qualifications were required of teachers if such courses were to be satisfactory.

Physics was an important subject in many post-graduate medical diplomas. In these, even more than in the undergraduate courses, careful selection of matter and method of presentation was required if the courses were to provide an adequate basis for specialist study and practice.

In the actual practice of medicine, physicists were becoming more and more responsible colleagues of the practitioner. The use of X rays and the rays from natural and artificial radioactive materials in the diagnosis and treatment of many diseases had involved physical problems of such complexity that for many years a physicist had been regarded as an essential member of the professional staff of any radiotherapy department. These physicists required special training, and means of obtaining this training were discussed. It had been found that other departments in the hospital were availing themselves of the services of these physicists to an increasing extent in both research and routine aspects.

In the development of the atomic energy projects "health physics" played an important part in ensuring the protection of personnel from radiation damage, and the help of physicists was being sought in other aspects of industrial medicine.

The interest taken by physicists in the practical problems of medicine had recently extended to the application of physical apparatus and methods in fundamental investigations in biology. Already important results had followed the cooperative efforts of physicist and biologist. It seemed possible that the biochemist in medicine would shortly be joined to the biophysicist.

Australia had lagged far behind other countries in these developments. Dr. Eddy said that it was not as necessary to inform medical men of the need for physical assistance as it was to inform the budding physicists of the opportunity that awaited them in medicine and of the way in which they should fit themselves to give that assistance.

The Liversidge Memorial Lecture.

The Liversidge Memorial Lecture, on "The Volatile Oils of the Australian Flora", was given by A. R. PENFOLD, director of the Museum of Technology and Applied Science, Sydney.

The Problem of the Origin of Insects.

In his presidential address to Section *D*, PROFESSOR O. W. TIEGS (Melbourne) said that the advent of insect life upon the earth was one of the most momentous events of evolutionary history. It was a vast group, whose species greatly exceeded in numbers all the other members of the animal kingdom combined. Their impact upon other forms of terrestrial life had been profound; the evolution of flowering plants had been ultimately determined by the presence of insects; but insects had also a dark side to their character, for they were the principal means whereby injurious microorganisms were conveyed to animals and plants.

The scientist who attempted to delve into their origin found an almost complete lack of fossil evidence to guide him and had to derive his conclusions instead from their structure. From the anatomy of an animal, and particularly from its embryonic development, much might be learnt in regard to its relations with other forms of animal life. In the case of the insects it was fairly clear that they had been derived from a small group of arthropods called the myriapods, whose most familiar members were centipedes and millipedes. The most primitive insects had been, and still were, wingless; but instead of walking on numerous legs like a centipede they moved on the three front pairs, while the hinder ones had retrogressed in their development and gradually disappeared. Vestiges of them were still present in some primitive insects and could easily be seen in the embryos of many others.

The development of insect life on the earth had had to await the advent of a terrestrial flora. This had begun to appear in the Silurian Period (about 300 million years before), but had started to flourish only in the Carboniferous, when the first coal deposits had formed. This had been the hey-day of insect evolution, and since it fell well within the period of recorded geological history one might hope some day to obtain direct fossil evidence of ancestral forms of insects.

The Role of the Imagination in the Study of History.

In her presidential address to Section *E*, ASSOCIATE-PROFESSOR KATHLEEN FITZPATRICK (Melbourne) said that there were at present signs of a reaction against the concept of history as a science, as in Professor Emery Neff's recent book "The Poetry of History" (1948). Professor Fitzpatrick said that her paper was not a contribution to the literature of that reaction. It was an attempt to show that the imaginative method was not a rival or alternative to the scientific method in the study of history, but a necessary accompaniment of it.

Theorists of history who placed primary emphasis on the role of the imagination were Croce and R. G. Collingwood. Both derived ultimately from the work of Giambattista Vico. Examination of Vico's major work ("*Scienza Nuova*", 1725) showed, however, that although he had assigned a very important part to the imagination, its task in the study of history was to contribute to a scientific end, a knowledge of the laws which governed the rise and fall of societies, nations or civilizations. The question with which Vico had been mainly concerned was one of causation: how did historical changes come about?

Extravagant claims on behalf of the role of the imagination in history (as in R. G. Collingwood's "Autobiography" and "Idea of History") were injurious to the study of history, as they tended to bring it into contempt with students of scientific mind (for example, Karl Pepper's "Open Society" and his articles on "The Poverty of Historicism in Economics"). The scientific mind could not rest content with the allegation of "insight" as a demonstration of a truthful interpretation of history, and the study of history could not afford to dispense with scientific minds.

Claims on behalf of the imagination should be temperate and should be substantiated by examples of advances in historical knowledge made by the use of the imaginative method. Examples were given from Vico and Herder and from some modern English historians, Maitland, Pollard and Tawney.

Professor Fitzpatrick concluded with some suggestions for methods of cultivating what the practising historian called "the feel of the period" or "the sense of the past"—the historical imagination. This was induced by exposure to impressions on which the imagination could work. These impressions were historical evidence. The work of the imagination was to observe evidence, particularly of kinds that were not immediately obvious, to perceive its significance and that of the relations in which it stood to other evidence, and to construct hypotheses of explanation. The work of the imagination should at every stage be checked by the test of consistency with the evidence. The work of the historian was closely related to that of the creative artist, but it was creative work performed under a severe discipline which absolutely forbade invention.

The Australian Aboriginal.

In his presidential address to Section *F*, PROFESSOR J. B. CLELAND (Adelaide) discussed the Australian aboriginal, the significance of his past, his present and his future.

After stressing the importance of ecology in its broadest sense in connexion with the Australian native, Professor Cleland drew a contrast between Sir Arthur Keith's opinion, expressed twenty-two years previously, that the Australian natives were not likely to be able to establish themselves successfully as full-bloods in a European community, and Professor Ashley Montagu's recent statement that culturally and mentally they would be indistinguishable from Europeans if brought up in the same environment.

It was pointed out that ever since the arrival of the first fleet in 1788 the Australian aborigines had been disappearing on coming into contact with European civilization in spite of all efforts to Europeanize them. This extinction had been due partly to interference with their hunting grounds and to disease, but probably chiefly to their loss of interest in life.

Professor Cleland discussed the effects of isolation on groups of human beings. He said that an attempt had been made to estimate the number of generations over which the present Australian natives had been isolated from contact with other peoples. Their blood groups and the diseases from which they suffered had been made use of to suggest that this separation was very ancient and probably had taken place more than 10,000 years previously, thus reaching back into the Pleistocene Period.

Professor Cleland considered the present and the immediate past of the natives. He contrasted those still tribalized and living off the country with those who were largely hangers-on to European civilization. Those living under natural conditions were much more healthy. Except in time of drought, when native game was no longer obtainable, the issuing of rations, except to the sick and old and those in employment, was of doubtful benefit to the natives, as it tended to deplete the natural food supply in the vicinity of the depot. The native population in the central reserves living off the land was greater than would be the case if the natives were replaced by a European or Asiatic race.

The nomadic natives were also exercising a considerable control over the rabbit and dingo, thus performing an important service for the white man.

Professor Cleland expressed the opinion that the full-blood natives should be left as far as possible living under tribal conditions in the reserves, but that as soon as they became detribalized measures should be taken, preferably through the missions, to give them such education as might fit them to lead a useful life on pastoral properties, adequately protected against exploitation. Gradual absorption through marriage with half-castes and these with the population at large seemed the only possible solution of Australia's native question. Native mentality, running parallel with European mentality, was of a high order in its own way, and there need be no fear that such an admixture of native blood would produce an inferior type as far as the aboriginal contribution was concerned.

Age Changes of the Aboriginal Skull.

In a paper on age changes in the aboriginal skull, PROFESSOR A. A. ABBIE (Adelaide) gave an account of the approximate time of suture closure in the skull of the Australian aboriginal. The series of skulls examined numbered 206, of which 37 belonged to juveniles and adolescents, 77 to females or probable females, and 92 to males or probable males. Age estimates were based upon the state of the teeth. In juveniles and adolescents the order of dental eruption was the guide. All skulls with a full erupted set of permanent teeth were treated as adults and graded according to the degree of dental attrition. Broca's grades of attrition were employed in correlation with Campbell's observations upon living aborigines. It was found useful, and probably of importance, to classify the sutures as: (*a*) those of the vault—metopic, coronal and sagittal; (*b*) those of the base—spheno-occipital, spheno-temporal, and masto-occipital; separated by (*c*) the elements of a "great horizontal suture", comprising the nasals, zygomatico-frontals, spheno-frontals, spheno-parietals, squamo-parietals, masto-parietals and lambdoid suture.

Professor Abbie said that most ethnological differences so far described depended upon the pattern of the vault sutures.

The great horizontal suture appeared to have special characters. It was the site of a number of fontanelles and most of the Wormian bones. In addition, its time of closure was, on the whole, much later than for the sutures of the vault and base. These characters, moreover, appeared to apply irrespective of ethnological affinities.

The sutures of the vault particularly, and also those of the base, generally started to close much earlier than the elements of the great horizontal suture. And apparently this applied equally to other ethnological groups. The only exception was where the two systems met. At the pterion and lambda the related elements of the great horizontal suture behaved like those of the vault in some 90% of cases; at the asterion the masto-occipital conformed to the pattern of the great horizontal suture.

The metopic suture closed before the end of the second year and possibly much earlier. It seemed likely that the incidence of persistence in adults was much less than the 1% usually quoted.

The coronal suture started to close early and by the end of adolescence 80% showed some evidence of fusion. Thereafter the incidence rose to about 100% by the age of fifty years. In all early cases, and probably in the majority up to fifty years, closure started at the pterion and spread upwards. From about twenty years on the *pars bregmatica* entered progressively more into this process, and after the age of fifty years more or less equal closure from both ends was found in about half of all skulls. Closure at the pterion tended to involve the neighbouring parts of the great horizontal suture—zygomatico-frontal, spheno-frontal and spheno-parietal—in a large number of cases; the upper part of the temporo-sphenoidal suture might also be included in the general process. Start of fusion in the middle (*pars complicata*) was uncommon (about 1%).

The sagittal suture began to close as early as the coronal, but the incidence was lower, being only about 33% by the end of adolescence. Early closure affected the *pars bregmatica* in most cases. When closure was deferred it tended to start more posteriorly—at the obelion or lambda. In adult females the anterior and posterior ends of the suture were almost equally involved, but in adult males the posterior incidence became progressively higher with advancing age. Fusion of the *pars lambdica* of the sagittal suture involved the neighbouring part of the lambdoid suture in some 90% of skulls.

On comparison of these two sutures it was evident that in both sexes the coronal was well ahead of the sagittal. At the same time, while the female tended to preserve the juvenile or "primitive" pattern of closure from in front, the male trend was towards the European, or "higher", pattern of closure from behind.

In the base the spheno-occipital suture was practically always obliterated by the end of adolescence and often much earlier. It might stay open a little longer in females, but never, apparently, in males.

The spheno-temporal and masto-occipital sutures might also start closure early, but, in contrast with the sutures of the vault, which generally closed away from the great horizontal suture, they tended to close towards this suture.

While it was true that the Australian aboriginal tended to cling to the juvenile pattern of closure from before back, there was a trend towards the more adult pattern of closure from behind forwards. This trend was most marked in males.

In one suture (the lambdoid) the female aboriginal might be ahead of the male, but suture closure generally was later than in the male in accordance with the more fœtal pattern of the female skull.

Ribbe's generalization did not hold for the aboriginal skull, for the shorter-headed females showed a more anterior initial closure, the longer-headed males a more posterior initial closure.

In contradiction to the general belief, at least some of the sutures in the skull of the Australian aboriginal were just as complex as those in the European.

Anthropological Studies as a General Introductory University Course.

PROFESSOR A. P. ELKIN (Sydney) opened the discussion in a symposium on anthropological studies as a general introductory university course. He outlined the educational and cultural values of anthropology from three points of view: (*a*) the time or depth view, reminding man that humans and their settled mode of life were only recent in time; (*b*) the space or breadth view, showing man as part of the geographical world and his adaptation to environment; (*c*) the inner or personal view, showing man's place in the wide human world. He pointed out that as man was part of his own very limited cultural world, students from a study of anthropology were brought to realize this. They thus developed respect for other cultures, not a feeling of superiority. As a logical sequence they saw why men behaved as they did—that the processes were rational. They saw that an individual was representative of his own small group as well as of a larger group, and so the study of anthropology engendered in the students a sense of responsibility for their own particular group and culture.

Professor Elkin stated that those who in the past received a classical education obtained a similar introduction, perhaps, to the culture of other peoples, but that such an education was now not common. He went on to discuss how anthropology also formed a background for other disciplines, that it made geography truly human; that its contribution to history was manifold, making it more sociological, throwing light on the period studied and on movements taking place in different periods; that social psychology was built on anthropology; that in the study of languages, music, the arts, politics, economics and science studies in general, anthropology supplied a necessary background.

Passing on to the question as to the most suitable stage for the introduction of anthropology into the curriculum, Professor Elkin said that at the University of Sydney it had been found best for the subject not to be introduced before the second year, by which time, having completed three first-year subjects, the student should have developed some post-school maturity, as well as having some background to the knowledge obtained. He stated that, although a number of students in Sydney studied anthropology for only one year, many of them continued it as a third-year subject, and others again were interested enough to take a post-graduate course.

MISS URSULA H. MCCONNEL (Queensland) discussed social anthropology and world citizenship and suggested that if the university was to be a training field for leaders in thought and skilled application, it was important to include in that training a knowledge of social as well as natural and physical science. She agreed that it was not for the average student to make a special study of social anthropology, but considered that he should know how social systems hung together, how they disintegrated, interacted and conflicted, so that in whatever career he found himself the student would be ready to take a more objective view of the social problems which confronted him. He would, in short, have received a training in world citizenship. Miss McConnel concluded by expressing the hope that the National University at Canberra, with its departments of Pacific and

social studies, might be able to make of Canberra a rehabilitation centre for a sick world.

PROFESSOR J. R. ELLIOTT (Tasmania) outlined an introductory course in ancient civilization, applicable to a very small university with a very small staff. He considered that such a course at least opened doors to wider fields and, moreover, called for no prerequisites. In planning it, Professor Elliott had taken into consideration the fact that there was no Greek course at the University of Tasmania and so he had based his first year on a study of Greek civilization, Greek culture being studied not so much from its literature as from other media, the study of the plastic arts of Greece, its historical features, drama and some of its philosophy. In the second year he sketched events from neolithic times, with particular regard to the eastern Mediterranean and Near East, up to Roman times, including a study of the arts; and in the third year he went back and took a vertical line right through the subject, dealing with religion and philosophy, science, laws *et cetera*. Such an introductory course of study, he considered, by giving a more varied view of man, taught the student to take stock of his own standards, and if a special part appealed to his interest he could follow it up elsewhere.

In a paper on anthropology and modern life, sent by DR. R. M. S. TAYLOR (New Zealand), a simple course whereby the student learned to apply anthropology as a guide to modern life, as a map was to a traveller, and acquired tolerance to the religious beliefs of others and an understanding of their forms of government, was advocated.

PROFESSOR A. A. ABBIE (Adelaide) considered that the discussion was unbalanced and would have been less so if the views of a Melanesian or an aboriginal on "our civilization" had been considered. He held that a study of anthropology was necessary for students of all faculties (particularly medical students), as it embraced everything that man was or did, and included human biology as well as social anthropology.

PROFESSOR OESER (Melbourne) pointed out that if anthropological training was to be introduced at the University of Melbourne the training in psychology would have to be enlarged enormously. He hoped in future to see anthropologists and psychologists working together. Meanwhile he outlined what was taught in social psychology in Melbourne.

PROFESSOR S. D. PORTEUS (Hawaii) reminded the meeting that those present were apt to forget that man was an individual as much as a member of a social order, and that a study of man as a social rebel was just as important as that of man as a social conformant. In a course which had been drawn up by Professor Wood Jones and himself, and was to have been given at the University of Hawaii, the object was to show the student that anthropology was the widest of all subjects for study.

PROFESSOR J. B. CLELAND (Adelaide) stressed the importance of a grounding in biology in all university courses, as students could not benefit from other studies without some biological knowledge.

In summing up, Professor A. P. Elkin agreed that there was something in the anthropological approach which could meet the life needs of students by helping to solve their personal problems—that anthropologists did not forget that man was an individual.

In conclusion, as the value of anthropology was being increasingly recognized by Commonwealth and State departments, Professor Elkin considered that requests for assistance in establishing departments of anthropology at those Australian universities which had not already got them, would receive a sympathetic hearing, and it was decided to forward a recommendation to the Council of the Association along those lines.

Epidemiology and the Efficient Parasite.

In his presidential address to Section *L*, PROFESSOR H. McL. GORDON (Sydney) discussed epidemiology and the efficient parasite and made special reference to the nematode parasites of domestic animals. He considered parasite behaviour from three points of view, namely, those of zoology, preventive medicine and ecological compromise. He said that the enormous biotic potential of most parasites was an indication of the hazards which beset the parasitic mode of existence. Deliberate, organized opposition to the realization of the biotic potential formed the basis of the application of epidemiological findings in the maintenance of parasite populations at levels which did not interfere with the health and productivity of economic animals.

It was not easy to establish criteria of efficiency for parasites even from the purely zoological point of view. A very large parasite population indicated biological efficiency, but might result in ecological inefficiency because of pathological effects on the host animal. However, the overwhelming of the host by the parasite could not be regarded as an indication of basic biological "inefficiency" of the parasite. A sacrifice of the individual for the benefit of the species was not solely the prerogative of man.

A concept of "balance" between host and parasite appeared to be no longer biologically acceptable. The relationships were so complex that one had to accept them as oscillations up and down a scale marked off in terms of population dynamics. Factors regulating population dynamics were usually discussed from biological, climatic and mathematical aspects. The interdependence of the first two and the rather over-simplification of the third aspect had to be carefully considered when the problem in question was one of control of a cause of economic loss.

The effects of phenomena of resistance and immunity, and particularly that aspect known as "self-cure", were potent regulating mechanisms of the populations of worm parasites in domestic animals. Professor Gordon discussed the varying significance of the different aspects of the biotic potential and its influence on adaptation and the geographical distribution of parasites and parasitic diseases in relation to some of the nematode parasites.

Epidemiological considerations commonly connoted obvious outbreaks of disease and were based on the assumption that disease depended on the number of parasites present. To some extent this was true, but a more precise clinical appreciation of the effects of light, so-called "subclinical", infestations indicated that when one had to deal with organisms having the attributes of nematode parasites, namely, ubiquity and tremendous biotic potential, a different approach was required. The establishment of seasonal patterns of changes in parasite populations and consequent adoption of control measures independent of diagnostic procedures provided lines of preventive action which were based on knowledge of parasitic behaviour.

Epidemiological studies on diseases due to nematode parasites should be largely based on population dynamics, with due consideration of short-term and long-term cyclical changes, in order that control measures might be given strategic and tactical applications. Through an examination of the efficiency of the parasite one sought its inefficiency with the object of exploiting weaknesses and thereby restraining its biotic potential.

The Control of and Resistance to Infection.

The meetings of Sections *I* and *N* were combined throughout the congress. The theme for discussion was "The Control of and Resistance to Infection".

The Nature of Immunity.

In his presidential address to Sections *I* and *N*, PROFESSOR F. M. BURNET (Melbourne) discussed the general nature of antibody production. He said that his interest in this problem had arisen out of work on staphylococcal toxin in the years 1928-1931. With Dr. Fenner he had just completed the rewriting of a monograph published in collaboration with Jackson, Freeman and Lee in 1941, and the substance of his address was taken from this monograph. He believed that all immunity was mediated by antibodies of one sort or another. If this was true, the production of antibody was the key to the understanding of the whole of immunology. Precise definition of the two words "immunity" and "antibody" was not easy. By immunity he referred primarily to the increased resistance to the damaging results of microorganismal invasion that followed recovery from an infection by the same organism or some other closely related species. The crux of the definition was that immunity was acquired and that it was specific. He had not the slightest quarrel with anyone who claimed that resistance to infectious disease depended on a great many other factors than antibody. If the term antibody was restricted to the familiar circulating antibodies that were the concern of clinical and experimental serology, it could be defined as a serum component made up of globulin, usually γ globulin, molecules which differed from the normal in being capable of specific union with the antigen which stimulated their production. More broadly, antibody was the reagent which mediated the specifically altered behaviour of body fluids or cells towards the antigen used for immunization of the animal. Certain important facts which had to be covered by any theory of antibody production might be summarized in the following way.

1. Antibody was a modified γ globulin differing from the normal γ globulin of serum only in its reactivity with antigen. Refined physical methods indicated that that was not quite true for some antibodies.

2. Antibody molecules differed from normal globulin molecules in possessing areas whose atomic configuration was such as to have a complementary adsorptive relation to the so-called determinant group of the antigen.

3. Antibody was produced in tissues, exemplified by spleen and lymph nodes, in which reticulo-endothelial cells (macrophages) were associated with lymphocyte production. This was based on the fact that in the early stages of immunization more antibody could be extracted from extracts or tissue cultures of the organ than could be accounted for by its content of plasma.

4. A second or subsequent antigenic stimulus of the same type provoked a more active production of antibody. Repeated experience of the same antigenic stimulus might result in a qualitative change in the character of the antibody as well as in the speed and extent of its liberation.

5. Circulating antibody was constantly being destroyed at a rate approximately proportional to its concentration, its "half-life" being of the order of fourteen days. The existence of detectable antibody in the serum was therefore in general an indication that it was still being produced.

6. Antibody production might continue long after the antigen had been eliminated from the body. The classical instance was the continued production of yellow fever antibody in a man seventy-five years after his last residence in a yellow fever area.

7. As a corollary to the last point, antibody production was a function not only of the cells originally stimulated, but of their descendants and/or of the cells to which the antibody-producing capacity had been transferred by some process other than that of genetic descent.

8. The physical and biological characters of antibody varied according to the species of animal used, the age of the animal, the route or entry of the antigen and the time and dosage relations of its administration. There was thus no automatic correspondence of antigen with the antibody produced in response to it.

Every biologist engaged in the study of any but the most superficial aspect of his special subject found that sooner or later he must seek help from many other biological fields. This held particularly for the immunologist. To read intelligently Landsteiner's and Pauling's studies on the behaviour of semi-synthetic antigens needed a comprehensive knowledge of classical organic chemistry. But the natural antibodies were proteins and as such must be studied not in terms of structural chemistry, but of physical chemistry as applied to macromolecules. Again, antibody was one of the circulating plasma proteins, produced by certain cells, liberated by some mechanism into the blood, and within a few weeks destroyed and completely replaced by further antibody. Here one came immediately against the physiological problem of the maintenance of that intensely dynamic system the circulating plasma. But antibodies differed strikingly from almost all the other isolatable constituents of the body, in that their chemical structures were adapted in almost infinite potential variety to the stimulus that called them forth. Principles quite different from the basic physiological ones which ensured the dynamic constancy of the internal environment had to be sought. These had been looked for in the work that had been done on adaptive enzymes and on the means by which unicellular organisms changed their character according to the chemical nature of their environment. To take another biological level, the genetic one, the antigenic components of mammalian or avian red cells were inherited according to Mendelian principles. There was clear evidence of the occurrence of mutations involving these characters and, as far as was known, all genetic studies had indicated a one gene-one antigen equivalence. Antigenic pattern was then in some rather direct way related to gene pattern. And finally the immunologist had to come back to the region from which his whole science had been derived, the influence of immunity on the manifestations of infectious disease. How did immunity influence the course of disease in a given individual, and what was its influence on the broad manifestations of disease in large communities?

In the mammal or bird, the only types of animal which had been studied comprehensively, there was a system of mesenchymal cells concentrated in the spleen, and in the mammal in lymph nodes, which possessed a double function. It was concerned with the removal and disintegration firstly of worn-out or damaged body cells, and secondly of foreign organic structures, microorganisms generally, that were introduced into the tissues. These two "scavenging" functions differed and must differ on a very important point. Effete body cells had to be destroyed and their building stones made available for the general metabolism of the body, without provoking antibody production. Microorganisms had to be similarly dealt with, but in the process antibody was produced to favour the individual's recovery and to provide specific immunity. The difference between the two responses, one without and one with antibody production, was in Professor Burnet's view the basic problem of immunology. It was part of the even more fundamental problem of the differentiation by living substance of self from not self. How, for instance, did an amœba digest a bacterium without digesting its own cytoplasm? Some day a team of biologists would spend gratifying years working out the comparative immunology of the protozoa and the invertebrates. Scientists might then have a basis for understanding the evolution of immunity.

To account for the absence of antibody response to the body's own cells it was assumed that the cells carried a certain number of "marker" components. In the cells concerned with the initiation of antibody production there were a corresponding number of cytoplasmic units bearing configurations complementary to the "self-markers". Union of the two complementary configurations initiated a streamlined process of enzymic disintegration of the cell or cell fragment. The "self-markers" were genetically determined and this might hold also for the "recognizing" intracellular units, bearing configurations complementary to them. Sooner or later the recognizing units came into contact with invasive microorganisms, providing foreign material of the same general nature as the "self-marker" constituents but with different detailed configurations. It was the essence of that theory of antibody production that some of the intracellular units were modified in a fashion equivalent to the change which gave rise to an adaptive enzyme, so that they developed a complementary configuration for the new substance which allowed of its disposal.

With the next step one came up against the greatest problem in biology—the synthesis of functional protein in the cell, especially of enzyme protein, and the relation between the protein and the nuclear gene which controlled its pattern. To account for the facts in regard to the liberation and transfer of antibody one had to assume first that the intracellular enzymic unit which had been modified by effective antigenic contact was capable of replication in the modified form, second that it could be transferred to other cells as well as descendants of the cells in which it was first induced, and third that partial replicas of the unit could be liberated into the blood-stream, where they were recognizable as antibody molecules.

Suppose one inoculated an antigen, influenza virus, for example, intravenously in the fowl. As it passed through the spleen it was taken up by the macrophages, within which an appropriate intracellular unit was produced, and rapidly transferred to the reticulum cells, from which both lymphocytes and macrophages were constantly arising. The transfer stimulated many of the cells receiving the unit to intense protein synthetic activity resulting both in active replication of the antibody-producing unit and in cell multiplication. This process was made visible histologically by the rapid appearance of plasma cells. The pyronin of the Unna-Pappenheim stain was virtually specific for ribo-nucleic acid and the characteristic picture of an enlarged nucleus with an active red-staining nucleolus and red-staining cytoplasm was indicative of active protein synthesis. All the evidence suggested that these immature plasma cells were the producers of antibody during the active phase of the antigenic response.

When the acute response to a given antigenic stimulus had died down, the modified intracellular unit persisted in the stem cells and was transferred automatically to the lymphocytes and macrophages derived from them. If one followed Ehrich and Harris, Dougherty, Chase and their collaborators, the lymphocytes were regarded as producers and carriers of antibody, but at a much lower level than the plasma cell. A plasma cell was in fact a lymphocyte which reflected its intense protein synthetic activity in its altered histological form. Successive generations of macrophages would also receive the modified units and as a result renewed contact with the antigen would find a situation different from that of the primary stimulus. The greater speed and intensity of the secondary response were almost certainly due to the fact that the antibody-producing mechanism was already in existence and capable of being called into activity. The "shadow factories" were tooled up and ready for instant action in an emergency.

What was the mechanism by which antibody played its part in the clinical and epidemiological pictures of infectious disease? How could one explain the extraordinary differences in the part immunological phenomena played in different diseases? These problems could be best attacked from the ecological and evolutionary angle; that was to say, one had to think of the way in which during the evolutionary history of mammals the phenomena of immunity could have influenced significantly the chances of survival of the host

species and on the other hand enforced adaptive evolutionary changes on the parasite.

When a strict parasite with only one ecologically significant host existed, it was clear that both parasite and host had found a *modus vivendi* which had allowed both species to survive. The mammalian immunity mechanisms had undoubtedly been evolved because they provided improved chances of survival against microorganismal invasion. The type of mechanism involved would be that which over the whole period of mammalian evolution had provided the most effective benefit to survival, *vis-à-vis* the dominant pathogenic organisms of the epoch. A clue might be obtained from the natural history of yellow fever. Formerly it had been evident that Europeans born and brought up in West Indian ports were immune from yellow fever, but adults coming straight from Europe had a very big chance of dying from their first attack of the disease. Yellow fever was characteristically less severe in young children than in susceptible adults. So were measles, typhoid fever, influenza (especially pandemic influenza) and tuberculosis. For some reason or other it was almost a general rule that children aged from four to twelve years had a lower mortality from any infection that they had never previously encountered than any other human age group. If one took an insect-borne disease like yellow fever as the typical infectious disease of man's ancestors during the predominantly arboreal phase of their evolution and accepted as a fact the relative insusceptibility of the half-grown young, one could easily see the high survival value of a mechanism which allowed the standard first infection to take place in childhood and to be followed thereafter by an immunity, reinforced by subsequent subclinical infection and transferred through the placenta or via the milk to the young as providing "cover" against infection during infancy. At the same time such a situation allowed the continued survival of the parasite.

Another type of danger from microorganismal attack that must have persisted throughout mammalian evolution was the existence of semiparasitic scavenging microorganisms, mostly bacterial, on the skin, in the throat and in the bowel. Various pathogenic organisms were probably derived from these saprophytic but potentially pathogenic scavengers. Little was known at present of the mechanisms by which in the average individual little harm was done by these organisms. Possibly the submucosal accumulations of mesenchymal cells with their concentrations in tonsil, appendix, Peyer's patches and so forth were in some way concerned.

Like the host, the parasite was a living organism, subject to the chances of survival and with a much higher mutation potential than the host. It had to be stressed that high virulence was not usually a character of high survival value for a parasite. To survive indefinitely the parasite would usually find that a combination of low virulence and free liberation from the infected host was the optimal condition for survival. If a highly virulent mutant arose, this would tend to dominate the ecological picture until a new equilibrium state was attained.

In this complex situation it was quite unjustifiable to assume either that the body's reaction to infection was that best adapted for its recovery or that the characteristics and activity of the pathogens were those best adapted for its survival. As a working rule the general antibody reaction of the host was of the type best suited to deal with a generalized virus infection like measles or yellow fever. The response to any extensive or generalized infection would therefore include the formation and liberation of antibodies, corresponding to each component of the microorganism that had an appropriate chemical structure. The amount and type of each antibody produced would depend on the mode of access of the microorganism and on the amount, the intrinsic antigenicity, and the accessibility in the organism of each antigen.

The influence of the antibody on the disease process would also depend on many factors. The accessibility of the pathogen was most important—in general the effect of antibody could be regarded as being to "blanket" the surface of the microorganism with host protein. This could be most effectively done while the pathogen was in the blood-stream. The high immunity found in measles and similar generalized virus diseases depended essentially on the fact that for symptoms to be produced the virus had to be generalized via the blood-stream. This resulted both in an intense antigenic stimulus and in high effectiveness of antibody action against any subsequent incipient infection. Where the pathogen was entirely intracellular, as in *herpes simplex*, antibody had virtually no influence. In influenza the virus spread from cell to cell in the film of fluid lying on the respiratory mucosa. It was influenced only by the concentration of antibody liberated into the film.

Even when there was clear evidence that recovery from an infectious disease was mediated by the development of antibody and that there was a high grade of subsequent immunity, it might be very difficult to ascribe the immunity to one particular antibody. Even a virus infection would provoke more than one kind of antibody and bacterial infections might produce a confusing multiplicity. To mention an important current problem, immunization against whooping-cough would probably be regularly effective only when it was known which components of the living bacillus were necessary antigens and how their presence and amount could be recognized in the vaccine to be used.

Sensitizing antibodies provided one of the major controversial subjects in immunology and clinical medicine. Was the development of tuberculin reactivity part of a valuable defence mechanism or a wholly unfortunate accident? It was difficult to answer that question; the scientific approach was to endeavour to understand its mechanism.

In concluding, Professor Burnet pointed out that until the last ten or twenty years neither immunology nor virus disease had had more than the most tenuous connexion with the general stream of biological thought. It had been of extraordinary interest to see how both subjects had gradually entered that stream and were now contributing ideas of high importance to both levels of theoretical biology—on the one hand to the understanding of subcellular and biochemical processes and on the other to the historical study of individuals and species in ecology and evolutionary theory.

Some Problems of Cross-Infection.

PROFESSOR SYDNEY RUBBO (Melbourne), discussing some problems of cross-infection, said that with the advent of the germ theory there had been among the civilized communities of the world a gradual decline in the damaging effects of epidemic disease. Hygienic and immunological measures had minimized epidemics due to endemic pathogens, and disease due to exotic parasites could be effectively prevented by quarantine. These positive contributions to the health of the community were so well known that they were frequently forgotten. However, the paradox of public health administration was seen in the lag of interest in air-borne infection compared with the log of progress in the control of food, water and milk borne infections.

Infectious disease had been formerly attributed to atmospheric miasmas, a theory which had disappeared with the advent of bacteriology. It was not unlikely, however, that the shift of emphasis from noxious gases to harmful particles had prejudiced the minds of many against air as a vehicle for dissemination of pathogenic organisms. The dramatic triumph of aseptic surgery, with its emphasis on the dangers of contact, had done much to conceal the consequences of air-borne infection. Even with the recognition by Flugge in 1897 of infectious droplets, and the adoption of the gauze mask in 1900, spray-borne dissemination had been considered as merely another manifestation of contact infection with an effective range of two to three feet from the site of emission. This concept had been finally refuted by Wells's demonstration that most atomized particles evaporated before falling the height of a man, leaving tiny nuclear residues, droplet nuclei, suspended in air currents. Furthermore, in recent years it had been realized that the sedimented droplets, on dehydration, contributed significantly to the loading of dust with pathogenic bacteria. It was now recognized that air-borne infection constituted an important problem in preventive medicine, irrespective of whether hospital, military, school, commercial or urban communities were being considered. At the same time, it was an inescapable and depressing fact that air-borne infections could never be controlled to an extent comparable with the control of enteric infections because the air breathed could never be preselected. Hence the mitigation of air-borne infections could be attempted only by the exercise of some control over homologous groups within the total population. Hospital, school and military groups might benefit from this type of control. The entry into school marked the beginning of communal life for the child and for the first time he was exposed to the full force of herd diseases. He entered this environment with a low degree of immunity to air-borne pathogens. Furthermore, with the entry each year of new "susceptibles" conditions were peculiarly suited to the production of epidemic or the continuance of endemic disease.

Professor Rubbo then discussed some recent investigations made in certain Melbourne schools. With his colleague Miss Holmes he had initiated an examination of the school group from the point of view of the prevalence and the sequelæ of hæmolytic streptococcal infections. The work was by no means complete, but enough had been done to allow a revealing story to be presented. Their interest in strepto-

coccal infectious was subsidiary to their main interest, the natural history of rheumatic fever. They considered that the well-established phenomenon of the high incidence of this disease in the poorer areas of cities was due to the high streptococcal infection pressures operating in people living in those places. Since the incidence of rheumatic fever was greatest between the ages of six and ten years, it seemed fairly obvious that it was necessary to look for high infection pressures in the schools of these areas. Accordingly, approximately 500 children coming from three different social levels of the community had been examined on three separate occasions. The examination had involved throat swabbing, tonsillar examination and Dick testing; in the last mentioned assistance had been given by Dr. Wilson, of the Public Health Laboratory. The streptococcal carrier rate, scarlatinal immunity, tonsillar enlargement and incidence of rheumatic fever had all shown distinct step-like increases as one passed from the children in the well-to-do areas to those living in the poorer districts. There seemed to be little doubt from these results that cross-infection was high among school children, particularly in the low rental areas. One could not say whether these cross-infections were due to contact, direct or indirect, to droplets or to dust. Sighting counts on the bacterial content of air in the schoolrooms had been made one month previously and had indicated the heavy loading of air and dust with organisms from upper respiratory passages in spite of the fact that they had been made during warm summer weather. Cross-infection in schools was a problem of some magnitude, for the sequelæ were seen not only in trivial skin and throat infections, but in rheumatic fever. The control of cross-infection in schools, particularly for children between the ages of six and thirteen years, might be attempted by education in hygiene, in which visual aids were used and the dangers of contact, droplet and dust-borne infection were stressed, by the oiling of floors and by the use of ultra-violet light and by an intensive tonsillectomy plan. Chemotherapy appeared to be the only method available for increasing the child's resistance to the hæmolytic streptococcus, and this would be too dangerous to adopt on a large scale, though it might be considered for those children whose hereditary background predisposed them towards rheumatic fever.

PROFESSOR F. M. BURNET (Melbourne) said that he appreciated the value of the work described in Professor Rubbo's paper, but wished to criticize one or two points in his presentation of it. In considering the epidemiology of childhood, he believed that, if an individual must sooner or later have this or that disease, he had better have it between the ages of four and twelve years. The same principle probably held with regard to less well-defined infections such as tonsillitis or the common cold. In an urban environment people were obliged to live with the nose and throat flora of their fellows, and it was important to acquire an immunity, during childhood, to the infectious agents with which they had to live. Of course, when a disease could be eliminated entirely, the necessary steps to eliminate it should be taken. One should, of course, try to avoid the dangerous sequelæ of common infections.

In regard to the particular age at which resistance to common infections was acquired, he recalled that in connexion with work on poliomyelitis a number of sera had been investigated for four common antibodies—namely, those produced by the staphylococcus ,the diphtheria bacillus, *herpes simplex* and influenza A. Of 40 or 50 children whose sera were examined some came from industrial suburbs, some from high rental areas. Immunity to diphtheria and herpes (as evidenced by the presence of antibodies) showed a definite relationship to social status, while the staphylococcus and influenza A appeared to have hit both groups equally. Examination of the sera of children in orphanages had shown that immunity to *herpes simplex* was almost always acquired between one and two years of age, so that in this infection and probably in some others the school was by no means the principal place where infection occurred.

DR. F. V. G. SCHOLES (Melbourne) said that Professor Rubbo had implied that a child entered on a new phase of existence when he first went to school. He thought it dangerous to generalize in that regard. An only child, who had been sheltered by a protective mother, might perhaps encounter his greatest danger in entering school or kindergarten, but in areas peopled by numerous families with young children, and where there was common play among the children, many infections were encountered in the pre-school period. In previous years diphtheria had been, and at present streptococcal infection was, commonly associated with certain residential areas. He believed that as far as the common bacterial diseases were concerned, it was desirable to get these over at the most favourable age period. In regard to the mode of transmission of infection, he had, rightly or wrongly, come gradually to the conclusion that, in the common bacterial infections, direct or semi-direct infection was more important than air-borne infection. (This statement did not apply to wound infection in surgical wards, but to infections such as scarlet fever.) The recovery of hæmolytic streptococci from the air of a room did not necessarily mean that persons in the room would be infected. In virus diseases, on the other hand, he had no doubt that air-borne infections were important. He had formed the opinion that dosage was important in bacterial infections, but not so important in virus infections, and that the danger of air-borne infection was much greater in virus diseases than in bacterial infections. In regard to sequelæ of streptococcal infections, nephritis was second in importance to rheumatic fever. The incidence of nephritis appeared to increase from the age of two to seven years, then gradually decreased between the ags of seven and twelve years. The incidence of nephritis in connexion with epidemics of streptococcal infection varied greatly; possibly this was associated with a change in the dominant type of streptococcus.

DR. J. BRUCE HAMILTON (Hobart) agreed with Professor Rubbo about the importance of the school as a source of infection, not only to children, but to their parents to whom the prevalent school infection might be conveyed. Much good work on infections in childhood had been done in America. He advocated strongly the establishment of chairs of child health at Australian universities.

DR. F. W. CLEMENTS (Canberra) said that he had been interested in the incidence of infection in the Lady Gowrie Centres. The question had been raised as to whether there was any difference in the incidence of infection in children who attended the centres and those who did not. Investigation had shown that, in the age group from one to two years, infections were more common in children attending the centres; after the age of three, the incidence of infection was approximatly the same in both groups. At present, by reversion to a former policy, children under three years of age were excluded from the centres.

DR. H. MCLORINAN (Melbourne) supported the statement that infections occurred not only in schoolrooms, but in play groups and in the street. During epidemics, one found that infections occurred in children from the same family rather than in children from the same school. Epidemics were commoner in boarding schools than in day schools. The school was most important in the spread of virus disease, but not so important in streptococcal infections. The question of tonsillectomy in chronic streptococcal infections was extremely controversial. The whole subject of rheumatism was difficult and uncertain at present.

PROFESSOR RUBBO, in reply, said that he agreed with Professor Burnet and Dr. Scholes that the period of childhood was characterized by a high rate of infection with a low mortality. Much that had been said supported his claim that the school age was a period of increased incidence of infection. The age incidence of nephritis mentioned by Dr. Scholes included the time of school entrance. Dr. Clements had mentioned the Lady Gowrie Centres; here again aggregation favoured infection.

The contentious question of natural as opposed to artificially acquired immunity had been raised; it had to be remembered that this point had been discussed in regard to tuberculosis at one time. No one would now argue that a child should be exposed to infection with the tubercle bacillus in order to acquire a natural immunity. He admitted that he was at a disadvantage because the work discussed was not complete. Further work would include swabbing of parents' as well as of children's throats.

Nutrition and Infection.

DR. F. W. CLEMENTS (Canberra) discussed nutrition and infection under two headings—the relation of nutritional status of humans to resistance to infection and the effects of infection upon nutritional status. He said that for most nutrients there was an optimal level of tissue saturation, and intakes above the amounts necessary to keep the tissues saturated either were not absorbed from the intestinal tract (for example, iron) or were excreted via the kidneys (for example, the water-soluble vitamins). There was as yet no evidence that tissue saturation with any nutrient was essential for optimal health. The object of consuming a balanced diet was to ensure, at all times, a high level of tissue storage of all nutrients; this was certainly desirable, if for no other reason, as an insurance against the effects of infection when it occurred.

The duration of life and the infantile mortality rates of the various countries of the world were frequently quoted as

examples of the effects of good or bad nutrition. During the last fifty years the expectation of life and the infantile mortality rates in some countries had improved to a remarkable extent. These countries, the Netherlands, Australia, New Zealand and the United States of America, also had the highest standard of nutrition. But it should not be forgotten that during this time considerable improvements had also occurred in the standard of living, general education, personal and community hygiene in these countries, whereas in countries with higher mortality rates the improvements in these fields had been small. It should not be forgotten that improvement in nutritional status moved parallel with those other factors and all and not one played a significant role in any change in mortality rates. The mortality from tuberculosis in various countries bore a relation to the standard of nutrition.

In broad general terms, the facts supported the belief that good nutritional status increased resistance to infection. Dr. Clements then discussed the evidence for this belief in regard to protein intake, vitamins *A*, *C* and *D*, and the vitamin *B* complex. He said that in recent years the importance of an adequate protein intake had been stressed by Paul Cannon, who reasoned that all bacteria were foreign proteins, that resistance to infection depended on the production of antibodies which were serum globulins and that for their production dietary proteins were required. However, there was no satisfactory proof that the level of protein intake had any effect on the synthesis of antibodies. The name "anti-infective vitamin" given to vitamin *A* in 1928 by Mellanby seemed, in the light of more recent work, to be of doubtful justification. Groups of children with adequate controls had been given vitamin *A* in various forms and the incidence of respiratory infections had not been reduced in comparison with the control group. There appeared to be no justification for the giving to infants and children of extra vitamin *A* above normal requirements to prevent the development of colds. Many experiments had been made on animals depleted of one or more members of the vitamin *B* complex and then infected with a bacterium or virus. The results were conflicting and more work was necessary. Lack of vitamin *C* likewise had not been incriminated, although scurvy modified some tissues in such a way that they became suitable media for the growth of bacteria. Changes in the gums similar to those seen in scurvy arose from trauma due to malocclusion, in subjects with adequate vitamin *C* intake, and they soon became the site of infection. Text-books still claimed that rickets predisposed to infection, particularly of the respiratory tract. Modern studies failed to support this. Reference was frequently made to a possible relationship between anæmia and resistance to infection. No scientifically controlled studies had been made to support this.

Work with mice had shown that, up to a point, natural resistance to infection was controlled by innate, genetic factors. There was some evidence to suggest that that principle was applicable to man. Melanesian natives had a greatly increased susceptibility to some of the exanthemata, sections of the white race appeared to have, at least, a partial resistance to leprosy, and there was great variation in the racial and individual susceptibility to tuberculosis. Possibly genetic effects modified the effects, if any, of diet.

Turning to the effects of infection on nutrition, Dr. Clements said that a considerable volume of evidence had shown, during the last ten to fifteen years, that in man infections with a number of pathogenic organisms greatly disturbed the metabolism of one or more nutrients, reducing appreciably the amounts available to the host. Wastage of nitrogen in the urine occurred in infectious diseases, and following surgery, trauma and burns. Patients with rheumatic fever, scarlet fever, upper respiratory infections and tuberculosis had been found to have lower plasma ascorbic acid levels than normal controls. Patients with tuberculosis had been shown to have depressed levels of vitamin *A* in the blood. Treatment of those patients with massive doses of vitamin *A* over long periods was needed to produce normal blood levels. Chemists at the Institute of Anatomy, Canberra, had found that the thiamine and riboflavine content of human milk fell significantly when the mother had an acute infection. The behaviour of iron in the body in infectious disease had only recently become the subject of intense investigation. The anæmia of infection was due to failure of the bone marrow to utilize iron rather than to the non-availability of iron. In conclusion, Dr. Clements said that while a relationship undoubtedly existed between the state of nutrition of the individual and his resistance to infection, there was no indication of its degree, of the manner in which it operated or of the nutrients involved. On the other hand there was considerable evidence to show that many infectious diseases interfered with nutrition.

PROFESSOR F. M. BURNET (Melbourne) said that Dr. Clements had performed a very great service in stressing the fact that there was no evidence that the incidence or effect of infections was related to nutrition. In virus work, experimental animals had to be in a good state of nutrition in order to provide good "takes". In experimental work on poliomyelitis in animals, it had been shown that when the animal's diet was low in vitamin B_1, poor "takes" were obtained.

DR. STANLEY WILLIAMS (Melbourne) said that as a clinician he was grateful to Dr. Clements for putting the brakes on the indiscriminate use of vitamins with the idea of preventing infection. From practical experience, he believed that Dr. Clements's emphasis on the importance of protein was the right one. He had seen a surgeon order an injection of 500 milligrammes of vitamin *C* for a patient whose wound was not healing well. He would like to ask Dr. Clements whether administration of vitamin *C* in this way reduced the time of healing of infected wounds.

MR. E. W. LINES (Adelaide) referred to the recent work of Lester-Smith in isolating an anti-pernicious anæmia principle. He asked if Dr. Clements knew of the effects (if any) of this principle on cases of so-called nutritional anæmia.

PROFESSOR S. RUBBO (Melbourne) mentioned one disease in which the effect of nutrition was known to be important—namely, dental caries. American workers had shown that elimination or reduction of disaccharides in the diet would lower the incidence of dental caries. The intake of fluorine was also important. Was this concerned with the chemical content of fluorine in enamel or was it a systemic effect?

A speaker said that as a veterinarian he was not familiar with the human aspect of the problem under discussion. In animals there appeared to be a definite relationship between nutrition and infection. He referred to the so-called "anaerobic" diseases which affected stock in Tasmania and which were caused by *Clostridia*. In all these diseases if a high state of body nutrition was not essential it was certainly a predisposing cause. The incidence was far greater in animals in good condition.

DR. E. S. MORRIS (Sydney) said that in some instances improved nutrition did seem to go hand in hand with increased resistance to infection. He cited the great fall in infant mortality in New South Wales since the establishment of baby health centres. Epidemic gastro-enteritis, once so prevalent in infants, had now almost disappeared. He asked whether this was not the result of improved methods of feeding and handling babies.

DR. F. W. CLEMENTS, in reply, said that he fully appreciated the work of the baby health centres, but would not like to claim that improvement in infant feeding alone had banished infantile gastro-enteritis. In reply to Dr. Williams he said that vitamin *C* affected the rate of wound healing, but he knew of no work on its effect in infections complicating wound healing. The antipernicious anæmia principle described by Lester-Smith contained 4% cobalt and was effective in doses of 2γ per day. He had yet to be convinced that there was any relationship between Lester-Smith's work and iron-deficiency anæmia.

The Role of Histamine in "Non-Specific" Immunity.

PROFESSOR E. R. TRETHEWIE (Adelaide), on behalf of himself and MR. ALLAN J. DAY, presented a paper on the role of histamine in "non-specific" immunity. He said that a word was first necessary to explain what was meant by the rather vague and somewhat paradoxical term "non-specific" immunity. It did not simply mean that an organism was better able to withstand some form of injury than others because of some better general health, as, for example, the resistance conferred by vitamins *A* and *D* against puerperal sepsis, but rather the state of affairs which had long been considered rather vaguely to exist at least in the minds of physicians, where one form of infection or injury was considered to protect individuals somewhat partially against another unrelated injury. For example, early in the epidemic of poliomyelitis a decade earlier it had been noted at first that there appeared to be some correlation between the incidence of diphtheria and poliomyelitis. Later figures had shown this correlation not to be significant, but the trend had excited thought at the time of a non-specific form of immunity. Burnet and Clark had suggested that the various mechanisms by which inflammatory responses were called into play became on the whole more reactive and more efficient up to the prime of life. More commonly forms of non-specific therapy were used in certain conditions in an endeavour to improve the condition of the patient with regard to the affliction from which he was suffering. For example, "TAB" therapy was given in certain joint conditions in the hope that a response would be evoked which would be beneficial.

It had to be admitted that there was little scientific background to support this therapy. However, many forms of empiricism were ultimately shown to have a firm foundation: the use of digitalis in dropsy was a case in point.

The aspect which they intended to discuss was that related to the liberation of histamine in certain forms of injury and the influence of a standard type of injury on the histamine response evoked by another injurious agent. It was to be remembered that there were many substances exerting their influence under different forms of injury, for example, histamine, leucotaxin, "S.R.S.", adrenaline, acetylcholine, necrosin, pyrexin, deaminating enzyme, adenyl compounds, coagulants, anticoagulants, potassium, and probably numerous others, and it was not unlikely that it was the pattern and variation of these substances liberated which accounted for the varied symptomatology in injury other than those due to reflex effects. At present, however, they were considering only one—histamine. Since it had been found that the standard deviation of the histamine content of the lungs of guinea-pigs increased with age and that the total content also increased slightly, it had been decided to determine if outside factors influenced the histamine content of the lungs. Some fifty animals had been selected at birth and divided into two groups and at the age of two weeks injections had been begun. In the treated animals 2·0 grammes per kilogram of peptone dissolved in Tyrode had been injected subcutaneously at three-weekly intervals. In the controls Tyrode had been injected. At the age of six months the lungs of the animals had been perfused. It had been found that following the injection of trypsin the animals which had already been treated with peptone liberated a far greater amount of histamine than the controls. The perfusion fluid issuing from the lungs which had been perfused through the pulmonary artery and the drainage fluid obtained after cutting down had both been estimated for their histamine content and it was noted that while 5·5γ histamine had been liberated on the average following forty minutes' perfusion from the control lungs, 21γ histamine had been liberated in the case of the peptone injected. The drainage fluid similarly had shown 2·4γ in the controls and 3·5γ in the treated animals. Since there had been a slight increase in the histamine content of the lungs of the peptone injected animals, this might indicate that the increase was due only to the slightly higher histamine content of the lungs. However, when the output had been estimated in relation to the histamine content of the lung, there was still a considerably greater output of histamine in the peptone lungs, which was highly significant statistically. These animals had been randomized and unless the experimental work was fallacious, it indicated that there was a very considerably greater output of histamine from animals already subjected to injury by another agent, such as peptone. While the histamine content of the lungs of the injected animals was not significantly higher than that of the controls, it had been found that when the histamine contents were recorded as a 2×2 table there was a significantly larger number of lungs in the upper half of the range with the peptone animals than with the controls when the histamine was estimated as total content of whole lungs in γ per gramme of the animal. It would seem that the influence of this injury on the histamine content was not so great as that concerning ease of liberation of histamine. Evidently some animals in the absence of peptone injections would develop an equally high histamine content in the whole lungs. When peptone was given, more animals achieved this level. It was possible, therefore, that there was an unknown factor responsible for the rise of histamine content in the lung in the natural course of events, which the speaker would call factor A. A known factor (factor B), such as peptone injections, might also cause the histamine content to rise, giving a shift to the population curve. Since there was not in this small series a significantly higher histamine content in all the lungs taken as one group, it was possible that factor A and factor B acted through an intermediary which was the mechanism responsible for increased histamine formation. In this way, when saturation, so to speak, was produced, little more histamine could be formed even in the presence of continued stimulation.

The increased output of histamine assumed some importance when taken into consideration with the findings of Miklós Jancsó that histamine activated the macrophages. He had shown that histamine stimulated the ability of the cells of the reticulo-endothelial system to engulf particles. Antihistamine inhibited this effect. Burnet had suggested that histamine might play an important part in the reactions to local trauma and infection by increasing local blood supply and capillary transudation. If then they were at the same time as producing an increased output of histamine by previous experience to reduce the toxicity of the histamine for the animals, this might be a valuable non-specific effect. That there was some reduction in toxicity following peptone treatment was shown by the corresponding $l.d._{50}$ estimation. However, the reduction in toxicity was not parallel to the increased output of histamine. It would seem, therefore, that for a local form of injury the increased output of histamine might be a valuable phenomenon. However, should the injury become generalized, it would be harmful.

It would be quite in keeping with general physiological principles that, if histamine liberation was a useful function in such common emergencies, it would become more readily initiated with "training". It indicated a principle which might involve many different activites of a cell, cells beng known to perform very many functions, though certain cells had particular functions more highly developed. Impulse conduction and histamine release might have this in common. Training might make further responses more ready and when stimuli which would take these pathways were stopped for a time the "learning" might be "unlearned". A similar activity might take place in anaphylaxis. Other phenomena were related. In a loop of intestine deprived of pancreatic juice the secretion of enterokinase gradually failed. Repeated stimulation of the vagus nerve caused an increase in the response to a stimulus of the muscle of the intestine even though this was not associated with an increase in the output of acetylcholine. Thus facilitation evidently occurred also in these instances. In a similar way another "emergency mechanism", antibody production, responded much more effectively to a later stimulus than to the first. In all probability other aspects of the "emergency response" to local infection would also behave similarly. Thus there was a useful effect in increasing local responsiveness, but a harmful effect if it became generalized. There was some evidence that the harmful effect, at least in less severe cases, might not be nearly so apparent. It had already been shown that histamine was liberated into the tissue spaces mainly and did not usually find its way into the vessels to a large extent in pneumonia in the cat. Provided the pulmonary effects were not so gross as to produce systemic effects, this was not inimical. Another phenomenon, possibly related to this changed toxicity to histamine following peptone had just been reported by Karády and Kovács, who considered that increased resistance following injury was due to formation of a substance they called "resistine". Another point of interest was whether these findings were relevant to the phenomenon of over-reaction to general infectious disease in humans of the 15 to 35 age group. The susceptibility of the young adult, particularly to infections which were not widely endemic, had been particularly discussed in relation to the influenza pandemic of 1918-1919. Epidemiologically, the young adult incidence of mortality had been the most important distinguishing feature of the pandemic. It had already been suggested previously by Burnet and Clark that in general the various mechanisms by which inflammatory responses were called into play became on the whole more reactive and more efficient up to the prime of life, but that this increased reactiveness was of survival value only in regard to local, especially traumatic, infections. It was a positive danger to infections generalized through the body or involving an extensive organ like the lung. It had still to be determined whether this changed reactivity of human beings was associated with increased ease of liberation of histamine and associated pharmacologically active substances, and if this was the case, whether the increasing ease was a result of recurrent fortuitous training in histamine liberation from the inevitable casual infections. The steady loss of reactivity in the present sense in individuals from the age of thirty-five to forty years onwards would have to be interpreted in the light of what conclusions were reached about the changes associated with adolescence and young adult life, the alternatives being a diminished reactivity to histamine-liberating stimuli or a diminished reactivity of the tissues to liberated histamine with the further alternatives that the altered condition was a simple, genetically conditioned result of aging or depended on some type of desensitizing action requiring repeated histamine liberation by appropriate stimuli. Further aspects of this subject would be reported on in the near future.

Professor F. M. Burnet (Melbourne) said he was very grateful to Professor Trethewie for bringing up a third aspect of the way in which infectious diseases could produce their effects. He had been very interested in two aspects of the subject: firstly that by "training" more histamine could be liberated, and secondly that some instances of "training" rendered the body more susceptible. As Professor Trethewie had said at the outset, histamine was by no means the only substance concerned. Professor Trethewie's work provided a big step towards the elucidation of such problems as the prime of life incidence of some infections, the age incidence of tuberculosis and the general significance of sensitization phenomena.

Immunization against Whooping-Cough.

DR. STANLEY WILLIAMS (Melbourne), in his contribution on immunization against whooping-cough, stated that prevention of whooping-cough was dependent on the development of a satisfactory vaccine for active immunization of infants. Considerable work on active immunization had been done in America and Australia and sporadically in England, but the problems were not yet completely solved. The mortality in whooping-cough was almost confined to children under two years, with the heaviest mortality in infants under one year. The mortality rate varied from time to time. A typical example was that of the year ending June, 1945, when 83 patients with pertussis had been admitted to the Queen's Memorial Infectious Diseases Hospital, Fairfield, Melbourne; among them there had been seven deaths, all in children under the age of one year. The actual incidence of whooping-cough in Australia was unknown; it was not a notifiable disease, and in any case the diagnosis of mild infections, in which a typical "whoop" never developed, was sometimes extremely difficult without laboratory investigations. Apart altogether from the serious mortality in infants, it was desirable to protect children against whooping-cough. The immunizing agent had to be sufficiently innocuous to use in the infant, and should provide sufficient immunity to cover an age range of from one month to six years.

The ideal vaccine was not yet available; all existing agents were liable to cause quite alarming reactions on occasion. In 1939 Dr. Williams had reported on the use of phase I vaccine prepared at the Commonwealth Serum Laboratories. It had been shown that 80,000 million organisms in five injections could be safely given to infants. Recent experience with a combined alum-precipitated diphtheria toxoid and phase I pertussis vaccine immunizing agent had shown that it could safely be administered to infants of six months and older. The preparation had been made at the Commonwealth Serum Laboratories, and he was indebted to the Director, Dr. F. G. Morgan, for having made supplies available. Two main schemes of dosage were described. An indurated lump invariably formed at the injection site, regardless of whether the injection was given subcutaneously or intramuscularly. Both Madsen in 1925 and later Sauer had realized, as Bordet had pointed out in 1910, that freshly isolated strains of *Hæmophilus pertussis* must be used for preparation of vaccines. Impressive field trials reported by Madsen, Sauer, Daughtry-Denmark and Pearl Kendrick had shown that a dosage of 40,000 to 110,000 million organisms in phase I (with the characteristics of freshly isolated strains) was required to confer maximum protection in children.

An intranasal technique for infecting mice had been described by Burnet and Timmins in 1937. That technique provided, as they had demonstrated, a means of testing in mice the efficiency of vaccines prepared for prophylaxis of whooping-cough in children. North and Keogh, in 1939, using this technique at the Commonwealth Serum Laboratories, had shown that the sera of children immunized with phase I vaccine would protect mice against experimental infection, whereas the sera of the same children taken before immunization had contained no antibodies. North and his co-workers had shown in 1941 that storage at low temperatures was necessary for preservation of the full antigenic efficiency of a vaccine. Recently Keogh and North had shown that a hæmagglutinating factor was present in *Hæmophilus pertussis* and that the virulence of different strains for mice and their immunizing potency were related to their content of hæmagglutinin. Present ideas on the necessary components of an efficient vaccine might require modification in the light of this work.

Samples of human adult sera might contain sufficient antibody to protect, for a short period, an infant exposed to whooping-cough. The observation of Keogh and North, that the protective value of sera in experimental infections in mice was related to their antihæmagglutinin content, might assist in selection of suitable sera for the passive protection of infants.

Attempts had been made to develop a skin test for determining susceptibility to whooping-cough. Dr. Williams's own results with various vaccines in different strengths had shown considerable variation, though in general a positive result had seemed to indicate susceptibility to infection. There was a growing tendency to use a combination of diphtheria toxoid and pertussis vaccine for immunization. There was no objection in principle to the use of combined vaccines; provided each component was an efficient antigen, their combination would not reduce antigenicity. Diphtheria, however, was a more serious disease and public health menace than whooping-cough. Since many more severe reactions would occur in children immunized with the combination, owing to the content of bacteria, than with diphtheria prophylactic alone, some health authorities considered that the use of the combination might lead to a fall in the number of children immunized against diphtheria. Immunization against whooping-cough did not invariably confer complete protection, but the disease, if not prevented, was attenuated.

More work was still required to assess the reliability of phase I agglutinogen for determining susceptibility to whooping-cough, and for the production of a vaccine causing no undue reactions in young infants, and providing satisfactory protection after one or two doses.

DR. F. V. SCHOLES (Melbourne) referred to a dreadful epidemic of whooping-cough in Melbourne in 1940, when 290 very young children had been admitted to hospital, of whom 90 had died. The history of vaccine prophylaxis of whooping-cough had been a curious one. The vaccine had been first introduced in the years 1910 to 1912, when a mixed vaccine, including staphylococci, pneumococci, and other common organisms, was employed. This had been used in private practice, and some medical practitioners thought it was effective in about 50% of cases. Others had reported no good results from the use of the vaccine. Of course this work had not been controlled. In regard to the infectivity of whooping-cough, Dr. Scholes observed that, although one could, by the use of cough plates, grow the organism during the third or fourth week from most patients, the children from whom these cultures were obtained were often in contact with other children and other persons, but apparently did not give whooping-cough to anyone else. With the introduction of the phase I vaccine it had been estimated that a child had a five to one better chance of escaping whooping-cough than in the old days. As to the use of combined vaccine, the position was difficult. Sauer in 1945 had not approved in theory of a campaign for mass immunization with combined vaccine. Since practically no child died of diphtheria under the age of twelve months, the immunization time of choice for diphtheria was at nine or ten months. There would be no advantage in mass immunization against whooping-cough at nine or ten months, for the vast majority of deaths from whooping-cough occurred in the first six months, perhaps in the first few weeks, of life. The proper thing to do obviously was to immunize a child against whooping-cough at the earliest age at which one could be sure antibody would be produced.

A large series of cases had been reported from America in which immunization for pertussis had been performed at three months. The response was not quite so good as that obtained later, but it might be worth while doing it at this age because of the greater risk. He thought that each child should be considered as an individual, and whether he should be immunized or not depended on the presence or not of an epidemic. On the whole he favoured immunization for whooping-cough at five or six months, and for diphtheria at nine or ten months.

DR. A. R. SOUTHWOOD (Adelaide) said that for some twenty years whooping-cough had been a notifiable disease in South Australia. He supposed that approximately 50% of cases were notified. A doctor was not always called in in cases of whooping-cough. The notification had value at any rate in drawing the attention of the parents to the infectious nature of the disease. In regard to the use of vaccine, he referred to a small series of cases reported from Oxford in 1945, when prophylactic vaccination had been shown to be of little or no value. The Medical Research Council in England was at present conducting a widespread investigation into the use of whooping-cough vaccine. Dr. Southwood read a letter from Dr. Metcalfe, of Manchester, describing the work on this subject which was being carried on in Manchester. No epidemic had occurred in Manchester subsequent to this extensive immunization, so that the results were not final.

In regard to the use of combined vaccine, clinicians were naturally anxious to use it, but the National Health and Medical Research Council was of the opinion that it was not expedient at present that public health authorities should advocate its use.

DR. E. S. MORRIS (Sydney) thanked Dr. Williams for his comprehensive and fair presentation of the subject. He was sure they would all welcome some finality in this matter. In New South Wales up to the present half a million children had been immunized against diphtheria. The results had been dramatic, as was shown by the fact that the annual incidence of diphtheria had fallen from three to six thousand down to a few hundred cases. He had been urged by the medical profession to inaugurate mass immunization against pertussis, but up to the present he had refused. Half a million children had been immunized against diphtheria and only three or four serious accidents had resulted from immunization; but immunization against

whooping-cough was more likely to have unfortunate sequelæ than immunization against diphtheria. He did not think that any good purpose could be served by compulsory notification of whooping-cough. The diagnosis was usually made after the "whoop" had occurred, and by that time the disease was non-infectious.

Dr. C. L. Park (Hobart) said he had always thought, with Dr. Morris, that notification was not of much value in whooping-cough. Lately, however, he had heard that in certain areas in Tasmania whooping-cough was much more common than in others. Notification might perhaps bring to the notice of the Health Department such facts, of which they were otherwise ignorant.

In regard to immunization, any procedure which would give from 60% to 80% of protection was a matter that no health authority could afford to ignore. He had recommended the free issue of whooping-cough vaccine to local authorities. Recently the Government of Tasmania had made combined vaccine available to local health authorities. In the previous year, in America, he had observed that in many places combined vaccine was given as a routine before the age of six months.

Dr. F. W. Clements (Canberra) said that in Canberra 90% of the pre-school children were immunized before they went to school. The demand by the public had led to this high percentage. Combined vaccine had been used. So far no epidemic had occurred to test the efficacy of this procedure.

Dr. John Miller (Tasmania) asked Dr. Williams's opinion about the existence of parapertussis.

Dr. W. K. McIntyre (Launceston) said that in his obstetric practice he always advised mothers to have their children immunized against pertussis at six months and against diphtheria at about twelve months. Recently he and his immediate associates had used the combined vaccine. So many local reactions occurred that they had given it up and gone back to the use of separate vaccines.

Professor F. M. Burnet (Melbourne) said that he was interested in the question only on the theoretical side. It was a much more difficult job to immunize an individual against pertussis than against diphtheria. Pertussis had been produced in mice and the essential lesion in mice was the multiplication of the whooping-cough bacilli in the ciliated epithelium of the upper respiratory tract. He believed that the symptoms of pertussis really resulted from interference with the function of the ciliated epithelium. The bacteria were thus on the surface, outside the body. In many ways the disease was similar to influenza. The effect on influenza of the antibody in the blood was not great, as only a small amount could reach the outers layers of the respiratory epithelium. Work had been done at the Walter and Eliza Hall Institute on the process of immunization against influenza in mice. An extraordinarily greater effect was produced if the vaccine was given intranasally. Any process that caused a lot of antibody to come into contact with the surface fluid of the respiratory tract was very favourable for recovery. He thought there was a case for intranasal immunization. Some vaccines seemed to be effective, others not. He had been in communication with Professor Wilson in connexion with the work being done by the Medical Research Council. Vaccines were being used by three different methods to find out how effective they were in mice. It would be a great advance if Dr. Keogh's work should show that the hæmagglutinin was the effective antibody. The problem resolved itself down to the question what fraction of the bacterial protein was the effective antibody and how should it be given? When this was known it would be possible to do something more effective than injecting huge numbers of organisms.

Dr. H. McLorinan (Melbourne) said that he agreed with Dr. Morris. Surveys such as those that had been discussed had served to put the brakes on uncritical enthusiasm. In diphtheria the problem was simple, as the infection produced a potent toxin responding to an antitoxin and an immunity against a specific toxin could be produced. In pertussis it was much more difficult, as the exact immunizing agent was not known. The enthusiasm of the general practitioner and parents for mass immunization should be curbed, as unsuccessful attempts at this would do harm.

Professor S. Rubbo (Melbourne) said that his interest in pertussis was a peripheral one, but he wished to point out that those who had had experience of cultivating this organism knew that it was difficult to cultivate on a large or even on a small scale. Whatever methods were devised, the initial bacteriological work was difficult. He could not see why there should be any objection to large doses of vaccine. He did not agree that it was a blunderbuss method. He could not see that there was any particular practical advantage in isolating the antigenic fraction, although this work was of great theoretical importance. No one would claim that prophylactic vaccination against typhoid fever was 100% effective. There the antigenic fraction was known, but it was not being used in preference to the vaccine itself. Dr. Gray, working in his laboratory, had shown that pertussis vaccine was much more effective when 24-hour cultures were used than it was when three-day cultures were used. He thought it was important to devise a technique for producing an effective yield of organisms in twenty-four hours. In the Oxford trials of pertussis vaccine the vaccine used had been prepared from three-day cultures, a fact that probably played a part in its inefficiency.

Dr. S. Williams (Melbourne), in reply, said that he appreciated the discussion which had followed his paper, and that he had learnt much from it. In regard to Dr. John Miller's question about parapertussis, there was some evidence of the existence of the condition, but its true incidence was unknown.

The Prophylactic Use of Rubella Gamma Globulin.

Dr. H. McLorinan (Melbourne), in the course of a paper on the prophylactic use of rubella γ globulin, stated that the work of Gregg had made the prevention of rubella during pregnancy a matter of almost national importance. In the present state of knowledge two lines of approach were possible. The first was the active immunization of all adolescent females by an actual attack of rubella. In this connexion the work of Anderson and Burnet on the transmission of rubella virus to human volunteers was of first-rate importance. The second possibility was the temporary passive immunization of pregnant women, who had come in contact with rubella, by the administration of the γ globulin fraction of either pooled adult or convalescent serum. The problem was more difficult than the prevention of ordinary measles in a child, for with measles it was often desirable to use sero-attenuation with a resulting modified attack of the disease, while in rubella the aim had to be complete prevention during pregnancy.

The opportunity to collect a fairly large quantity of convalescent serum had arisen in Melbourne in September, 1947. In July and August of that year 165 cases of rubella had developed among the personnel of Flinders Naval Depot. With the cooperation of the medical staff of the depot, under Surgeon-Captain Lockwood, the Australian Red Cross Blood Transfusion Service had collected blood from 55 volunteers who had recently had rubella. The average time of collection was 23 days after the attack. From these donors an amount of 12·75 litres of serum had been obtained. Dr. F. S. Morgan, Director of the Commonwealth Serum Laboratories, had consented to prepare the γ globulin fraction of the serum free of cost. Tests of this preparation had shown that the antibodies commonly found in pooled serum had been concentrated eightfold.

During the twelve months ended December 13, 1948, γ globulin had been given to 63 pregnant women who had been reported as rubella contacts and who with three exceptions were in the first four months of pregnancy. Most had been given the serum less than seven days after contact. Fifty-eight of the women had shown no symptoms of rubella; no reports had been received from five others. At present 13 had been delivered of apparently normal babies. Two had aborted hydatidiform moles at four and a half and five months respectively. In all but one of the others pregnancy was progressing normally.

Dr. McLorinan said that his statement had to be regarded as an interim report, and added that considerable observations over a much longer period should be carried out. A critical analysis revealed many obvious gaps in the evidence. Firstly it could be asked whether all the infected persons with whom contact had been reported were definitely suffering from rubella, and secondly how many of those who had been given γ globulin had had rubella previously. Thirdly, some of the patients treated with γ globulin might nevertheless have developed a subclinical attack of rubella, which might still produce some effects on the embryo. It would be necessary in many more cases to follow the women through to the end of pregnancy and for some time afterwards. The significance of the occurrence of two hydatidiform moles could not be assessed. Even so, Dr. McLorinan felt that it was pardonable to be optimistic and to advise that if the specific γ globulin was given early after contact there was more than a reasonable chance that the occurrence of rubella would be prevented. There was ample proof of the necessity to collect more blood from convalescent rubella patients for the preparation of the specific γ globulin. Should supplies become plentiful, one might even consider the necessity for repeated injections of γ globulin throughout the danger period of pregnancy when rubella was in epidemic form in the community.

DR. F. V. SCHOLES (Melbourne) said that the discovery of the nature of the congenital defects produced by rubella was one of the most dramatic developments of the previous few years. Perhaps some of his hearers had wondered why the discovery had taken place in Australia. It had, of course, been made by Gregg, of Sydney, in 1941, and followed up by the work of Gregg, and of Swan and others in Adelaide. At a meeting of the Ophthalmological Society in Adelaide Dr. Scholes had put forward the following explanation.

During the years 1914 to 1923 there had been little or no rubella in Australia. There had been a small epidemic in 1923, and then from 1923 to 1940 another long interval, during which no real epidemic occurred, although an occasional fortuitous or exotic case had been seen. In 1941 an epidemic of rubella had commenced in New South Wales and had spread rapidly, probably because during the war the constant movement of large numbers of young people from one part of Australia to another favoured the spread of an epidemic. During the previous seventeen years most people in Australia had not been in contact with rubella, so that in the 1941 epidemic large numbers of young pregnant women acquired rubella. The actual figures were rather astounding. There had therefore been an increased chance that the unborn child should develop lens opacities or deafness. The chance of damage being done had been very great indeed.

He thought that Dr. McLorinan's work was of great importance. Its application was a matter for each individual practitioner to decide for himself. Every mother should see that her daughters suffered from rubella. They should encourage the development of rubella in young children. It was a pity that there was some confusion in the public mind between rubella and measles. Information about rubella was given to the Press from time to time. The heading was frequently: "What to do in case of measles." It was a pity that rubella had ever been given the name of German measles.

When it was discovered that a woman who happened to be pregnant had rubella, his honest belief was that the pregnancy should be terminated, but there were great difficulties in the way of carrying that procedure out, and it would be difficult to enact legislation to make it legal.

DR. A. M. HILL (Melbourne) mentioned two patients, one of whom had had rubella in the ninth week of pregnancy, and had subsequently had a child with double congenital cataract. In the second case the mother had had rubella at the tenth week of her pregnancy and her child was blind and deaf and apparently mentally deficient. From his small experience he would have no hesitation in recommending the termination of pregnancy. In the previous year at the Women's Hospital in Melbourne there had been an increase in the number of hydatidiform moles. He wondered if this had had anything to do with a virus infection. Dr. McLorinan had mentioned that two of his patients had had hydatidiform moles, but even if this was associated with the injections Dr. Hill thought it was better for a woman to have a hydatidiform mole than to be so unfortunate as to have a deaf mute child.

DR. W. K. MCINTYRE (Launceston) said that he had had experience of a number of cases in which the mother had had rubella during pregnancy and the child had been blind or a deaf mute, but there were difficulties in the way of recommending termination of pregnancy. Dr. McIntyre was interested in Dr. McLorinan's mention of two cases of hydatidiform mole. He had noticed in his own practice that hydatidiform mole was more common than formerly. Comparatively large numbers of cases occurred in patients from the north-west coast of Tasmania. He thought hydatidiform mole should be declared a notifiable condition, in the hope of elucidating its cause. For the same purpose, he had often thought that compulsory notification of eclampsia might be a good thing.

DR. I. M. MACKERRAS (Brisbane) said that the secondary issues which had been raised were extremely interesting and important, but he would like to revert to the subject of the paper, which was one of the most fascinating things which had happened in immunology. Protection of the embryo *in utero* had not been attempted previously. The most vital statistic necessary was the incidence of abnormalities in infants whose mothers had had rubella during the critical period. He asked Dr. McLorinan whether any machinery had been set up to determine this.

PROFESSOR F. M. BURNET (Melbourne) said that quite extraordinary interest had been aroused by the whole subject. He had found that in the rest of the world, the work done in Australia in discovering these conditions had made a very considerable impression. He was hopeful that the work now being done in Melbourne would prove to be of first-rate importance. It had been a most heartening experience to be able to tell inquirers that they could apply to Dr. McLorinan for a form of treatment which had quite a fair chance of preventing infection in rubella contacts. He had tried to get as much information as possible about the incidence of damage to the child after maternal rubella. There were, of course, a tremendous number of congenital defects which could not be related to rubella. Other infections might possibly be responsible for some of these. One, at least, was known, namely, toxoplasmosis, which could produce congenital infection without the appearance of symptoms in the mother. Dr. Hill's remark about hydatidiform mole was very intriguing. Obstetricians should make an attempt to find out whether congenital abnormalities encountered by them could be related to something that had happened during pregnancy. Prenatal pathology was an almost entirely new field.

DR. S. WILLIAMS (Melbourne) said that perhaps few could realize the onus that fell on Dr. McLorinan in carrying out the clinical use of the serum. As Burnet and Anderson had shown in their work on the prevention and attenuation of ordinary measles by γ globulin, there was a considerable variation in the dosages required for attenuation and prevention respectively.

DR. F. V. G. SCHOLES (Melbourne) was surprised that no one had raised the question why rubella was singled out among infections to cause such unprecedented risk to the embryo. At a meeting of the Ophthalmological Society he had been asked why the same thing did not occur in ordinary measles, many cases of which occurred in young adults. Two reasons might be suggested. First, in ordinary measles there was a more violent reaction to infection and much greater damage, often producing termination of pregnancy. Secondly, the rubella virus might possibly be of a size which could pass through the placental barriers.

PROFESSOR F. M. BURNET said that if any obstetrician felt it necessary to terminate pregnancy and could obtain an embryo, it might be of great interest to have it examined histologically. He would be glad to have the opportunity of examining such a specimen.

(To be continued.)

Correspondence.

DEEP BREATHING IN CORONARY DISEASE.

SIR: In THE MEDICAL JOURNAL OF AUSTRALIA, Volume I, 1949, page 484, Dr. J. G. Sleeman wisely commends deep-breathing by the recumbent patient to prevent venous thromboses. May I suggest, please, that it has great value also in improving coronary circulation? Every middle-aged or elderly person of sedentary habit should be taught to lie down, or lie back in an easy chair, and to breathe slowly and deeply five or six times and to repeat this procedure several times a day. The consequent flooding of the coronary vessels and improved nourishment of the myocardium tend to prevent both coronary occlusion and dysmyocardia.

Yours, etc.,
GUY GRIFFITHS, M.D.

Sydney,
April 8, 1949.

THE GOVERNMENT AND THE MEDICAL PROFESSION.

SIR: It is certain that we all share Mr. L. J. Dowling's objection to departmental control of the profession. We will all support the Council in any proper endeavours to have the opinions of the profession heard and taken into account; and we all agree that the independence of the profession in its professional activities should be guarded as far as is consistent with the general interests of the people.

But we must not confuse the issue. It is not a question of socialism *versus* anti-socialism. Neither the *Pharmaceutical Benefits Act* nor the National Medical Service Bill is socialist. Both are interventions by a capitalist State in the practice of medicine. They constitute nothing novel. State interventions have been occurring for many years. The development of trade and industry has been accompanied by the development of science, including medicine, and by the recognition that the State must take its part. For example, consider public health, infectious diseases, tuberculosis, lunacy, care of children, workers' compensation, public hospitals, factories acts *et cetera*. All this develop-

ment proceeds within capitalism, the system of private enterprise.

Socialism means the collective ownership of the means of production and payment according to work done. A socialist system of medicine can only be built under socialism. It is indisputable that the Chifley Government does not mean to introduce socialism, and could not if it would; the Constitution does not permit it.

Let us not confuse the issue. We want reasonable and just treatment from the Government and we want to preserve our democratic professional rights and be free from bureaucratic rule. Socialists and anti-socialists can unite on these grounds. An incorrect assessment of the position has already caused needless panic in some quarters and probably contributed to errors in policy.

Yours, etc.,

G. P. O'DAY.

473 Bourke Street,
Melbourne,
April 8, 1949.

AN UNUSUAL SYNDROME.

SIR: We have read with interest the letter of Dr. Cameron in the issue of April 9, 1949, relative to an outbreak of cases of pleurodynia (? Bornholm's disease) in the Bathurst district. Similar cases have been under treatment here during the past few weeks characterized by sudden onset of pains around the costal margin fluctuating several days and with no clinical or radiological evidence of pleurisy. Temperatures up to 102° were recorded in some. In one house all the children in one family were affected.

Two Balt migrants are recent arrivals in the district, but we have not noted any direct contact between these and the affected persons.

The number affected here who sought medical treatment would be about twenty.

Yours, etc.,

H. G. RICH.
G. SCOTT.

Narrandera,
New South Wales,
April 11, 1949.

SIR: I refer to Dr. R. E. B. Cameron's letter, "An Unusual Syndrome", published in THE MEDICAL JOURNAL OF AUSTRALIA of April 9, 1949.

During the last month at least seven patients have visited me with a syndrome much the same as Dr. Cameron describes in his preliminary report. Indeed this syndrome was discussed with the other medical practitioner in Oakey, who had also met with a number (unspecified) of similar cases, about a week before Dr. Cameron's report appeared. It was agreed that a mild epidemic of some unknown infection concentrated in the diaphragmatic area was occurring in the district.

The clinical picture as I first saw it could best be described as a combination of *herpes zoster* without a rash and/or diaphragmatic pleurisy without significant lung or pleural signs.

The presenting symptoms have been lower thoracic or infracostal pain, worse on taking a deep breath and accompanied sometimes by shoulder pain. There is also a fluctuating intensity of pain. A mild temperature occurs. The patient is more distressed by the pain than by a general malaise. The illness appears to be benign, and it resolves in a few days. It corresponds with other descriptions of Bornholm's disease published in previous years in the *British Medical Journal*.

Oakey is a town situated in the Darling Downs, Queensland. My cases have come from the farming community. Their distribution has been irregular. No influx of migrants has occurred in the district.

Yours, etc.,

J. DE VIDAS, M.R.A.C.P.

Oakey,
Darling Downs,
Queensland.
April 18, 1949.

INFANTILE CEREBRAL PALSY.

SIR: May I comment on two aspects of infantile cerebral palsy as discussed by Dr. Claudia Burton-Bradley in her article published in your journal of March 26, 1949?

1. In the summary Dr. Burton-Bradley advises: "Firstly, make an early diagnosis." In the text, however, this good advice is qualified by a statement: "Treatment should begin early—at the age of eighteen months if possible." Twenty years of work has taught me that the provision of care to a cerebral palsied child at eighteen months cannot be regarded as "early", but as care undertaken at least ten months late. To anticipate deformity, to save the child unnecessary architectural handicaps imposed on those which may fairly be attributed to the lesions, care should commence as soon as cerebral palsy is diagnosed.

In some children the condition may be evident from birth. In others, delay in passing the normal milestone of sitting up may induce a careful doctor to seek data about the obstetrical history, the neo-natal history, and to keep a watchful eye for trouble ahead about the seventh month. For the majority of children, however, the chance of recognition at seven or eight months will not occur until all obstetrical hospitals arrange a systematic follow-up of all babies of the following groups: (*a*) Those whose birth was premature, post-mature or difficult. (*b*) Those whose mothers had rubella or other sickness during pregnancy. (*c*) Those who, in the neo-natal period, (i) delayed in establishing normal respiratory rhythm which may or may not have been associated with evidence of intracranial hæmorrhage, or (ii) developed severe jaundice.

Such a follow-up service from birth has been carried out by Dr. Kate Campbell at the Women's Hospital, now in association with Dr. J. Glyn White, and by Dr. Campbell in association with Dr. Elizabeth Turner at the Queen Victoria Hospital, Melbourne.

To these workers I am indebted for the opportunity to contrast the result of care instituted before eight months with that delayed until eighteen months. Examinations at monthly intervals are necessary because of a latent period which often occurs. A child may appear a normal baby to a careful observer at four months and yet show definite evidence of cerebral palsy at seven or eight months, as shown by overaction of certain muscle groups. The overacting muscle groups may be any or all of the following: the adductors of the thumbs, flexors of the wrist and fingers, pronators of the forearms, adductors of the shoulders, rotators of one side of the neck, the lateral abdominal muscles of one side, the flexors, adductors and internal rotators of the hips, the calf muscles. Unopposed contraction of adductors of the hips calls for immediate care.

If adductor spasm is allowed to act unceasingly for 300 days and 300 nights between the eighth month, when the condition could be recognized, and the eighteenth month—if care is delayed until that date—the abductors of the hips become tired and stretched and too often a femoral head is levered out of a potentially normal acetabulum.

A child with cerebral palsy has enough to contend with to overcome the handicaps due to his initial lesion without having a dislocation of one or both hips unnecessarily added to his burdens. If care is provided as soon as adductor spasm is evident it is easy, by simple appliances, to keep the balance between the adductor and abductor muscles, to hold the developing heads of the femora and the acetabula in their correct relationship and thus to protect the child from the risk of a dislocation. By this means we have found that the tendency to scissor disappears. The child commences his walking life on a wide base.

Because in Victoria the emphasis has been placed on the recognition and provision of care in the first year, the question of intelligence tests does not arise so often as a preliminary to physical care.

2. I would suggest that any doctor reading only the summary of Dr. Burton-Bradley's paper may be misled into believing that the intelligence of children with cerebral palsy can be accurately classified by "intelligence" tests. In the preceding text, however, it is stated that several tests have been used "fairly successfully in providing a pointer to basic intelligence"—a fairer statement.

Experience has taught me that observation is necessary over weeks or months by persons familiar with the handicaps, sensory and motor, of the cerebral palsied child before the intelligence can be estimated, or a guess made as to future intelligence.

In conclusion, may I quote from "Matrix of the Mind" by Professor F. Wood Jones a passage which, though written in 1928, may be reiterated with benefit in 1949?

> In the meantime it would become the clinical psychologist, unless he wishes future generations to class him with the phrenologist and physiognomist, to modify some of his loud-sounding claims and to admit honestly that he is far from being able to test and

measure intelligence as capacity for new adaptations. His work will rest on a common sense basis only when he recognizes that there are many traits for which he has no adequate tests and which are absolutely essential to progressive adaptability.

Would it not be wise and honest to scrap altogether the term "intelligence quotient" and to speak of the test verdict merely as what it is—an elementary learning capacity index?

Applied as an index of immaturity, mental tests have their value, and as such they are not likely to be replaced; but that they are applicable throughout the whole range of ability, from imbecility to potential genius, seems an utterly absurd expectation.

Some psychologists waive the question of the validity of the tests altogether and set out with the definition that "intelligence is what the tests measure"! That such an unintelligent assumption is possible in people who are writing about intelligence would seem inexplicable to the common man's understanding.

Yours, etc.,

41 Spring Street,
Melbourne,
April 12, 1949.

JEAN MACNAMARA.

Naval, Military and Air Force.

APPOINTMENTS.

THE following appointments, changes *et cetera* have been promulgated in the *Commonwealth of Australia Gazette*, Numbers 20, 21 and 22, of March 10, 17 and 24, 1949.

AUSTRALIAN MILITARY FORCES.

Interim Army.

Royal Australian Army Medical Corps.

VX700057 Captain J. M. Jones is appointed from the Reserve of Officers, 26th August, 1948.

The following officers relinquish the temporary rank of Major and are transferred to the Reserve of Officers (Royal Australian Army Medical Corps): Captains (Temporary Majors) WX501273 C. G. Batten (3rd Military District), 25th December, 1948, VX700028 I. A. McDonald (3rd Military District), 5th January, 1949, SX34533 R. S. Colton (4th Military District), 23rd October, 1948, and SX700019 G. F. Cheeseman (4th Military District), 7th January, 1949.

The following officers are transferred to the Reserve of Officers (Royal Australian Army Medical Corps): Captains NX506301 L. G. Abbott (2nd Military District), 7th December, 1948, VX700057 J. M. Jones (3rd Military District), 27th October, 1948, VX700067 G. P. Cromie (3rd Military District), 14th January, 1949; SX700014 R. M. C. G. Beard (4th Military District), 8th January, 1949, SX700017 W. J. McCann (4th Military District), 20th November, 1948, SX700020 M. deL. Faunce (4th Military District), 6th January, 1949, and VX504193 F. Grunseit (2nd Military District), 24th December, 1948.

To be Temporary Major, 15th November, 1948.—SX700018 Captain G. B. Fisk.

Reinforcements.—The following officers are appointed from the Reserve of Officers, and to be Captains: Honorary Captains VX700072 C. B. Bailey and VX700073 R. R. Clark, 3rd December, 1948, and VX700077 T. H. Hurley and VX700078 R. W. Webster, 15th December, 1948.

Active Citizen Military Forces.

Eastern Command (Second Military District).

Royal Australian Army Medical Corps.—The following officers are appointed from the Reserve of Officers with Regimental Seniority in accordance with Army Seniority, 1st May, 1948: 2/146527 Major J. F. C. C. Cobley and 2/139202 Captain P. C. P. Waugh.

Southern Command (Third Military District).

Royal Australian Army Medical Corps.—3/101007 Major R. Motteram is transferred to the Reserve of Officers (Royal Australian Army Medical Corps) (3rd Military District), 7th December, 1948. To be Captains (provisionally), 17th December, 1948: 3/101008 Ivan Samuel Epstein, 3/58525 Keith Archer and 3/97030 Peter Clement Burton Bradley.

ROYAL AUSTRALIAN AIR FORCE.

Citizen Air Force: Medical Branch.

The appointment of Temporary Squadron Leader H. P. Greenberg (267761) is terminated on demobilization, 14th January, 1949.

The date included in the notification regarding Temporary Wing Commander K. G. Colquhoun (3232) and Temporary Squadron Leader J. B. Turner (6425) as approved in Executive Council Minute No. 5 of 1949, appearing in *Commonwealth of Australia Gazette*, No. 4, dated 13th January, 1949, is amended to Read 30th November, 1948.

Stanley Francis Reid, O.B.E. (251174), is reappointed to a commission with the temporary rank of Wing Commander, 1st January, 1949, for part-time duties.

Donald Fergus Buckle (263865) is reappointed to a commission with the temporary rank of Flight Lieutenant, 1st January, 1949, for part-time duties.

Reserve: Medical Branch.

The appointments of the following officers are terminated, 31st December, 1948: Temporary Wing Commander S. F. Reid, O.B.E. (251174), Temporary Flight Lieutenant D. F. Buckle (263865).—(Ex. Min. No. 12—Approved 9th March, 1949.)

CITIZEN NAVAL FORCES OF THE COMMONWEALTH.

Royal Australian Naval Volunteer Reserve.

Promotion.—Surgeon Lieutenant Henry George Rischbieth is promoted to the rank of Surgeon Lieutenant-Commander, dated 18th January, 1949.—(Ex. Min. No. 12—Approved 16th March, 1949.)

Obituary.

CHARLES ALISTER McHARDY.

WE are indebted to Dr. D. Coleman Trainor for the following appreciation of the late Dr. Charles Alister McHardy.

On March 11 last Charles Alister McHardy died at his home in Double Bay. He had had a mild coronary occlusion, from which he appeared to be recovering, when a second one carried him off very suddenly.

After his graduation Dr. McHardy served as a resident medical officer at Sydney Hospital and then at the Renwick Hospital for Infants, where he later became superintendent. He commenced practice in Double Bay about twenty years ago, and, with a break of four years during which he served with the Royal Australian Air Force, practised there until the time of his death.

Many people will mourn his passing: his fellow practitioners in the Eastern Suburbs, who knew him for a courteous and able colleague; the many patients who felt the benefit not only of his professional skill, but of his gentleness and understanding in their sickness; but especially those who had the privilege of knowing him more intimately and of understanding the fineness of his character. That he should have been a success in practice was inevitable, for he had the ability and professional skill which make a competent practitioner. But the desire for material success was never the dominating motive of his life. Fundamentally he was a deeply religious man, a thinker and a philosopher, and he brought to his work a kindliness and understanding which arose from the spirituality of his own beliefs.

Though Alister McHardy was a young man—he was only forty-seven—he had much of the scholarship which we associate with an older generation of doctors. It was his conviction that too many people hurried through life without ever pausing to reflect towards what they are hastening. Now he himself has hastened on, but those who knew him best will not forget him.

ALDOUS CAMPBELL ARNOLD.

WE regret to announce the death of Dr. Aldous Campbell Arnold, which occurred on April 15, 1949, at Newcastle, New South Wales.

EDWARD AMBROSE STORMON.

We regret to announce the death of Dr. Edward Ambrose Stormon, which occurred on April 17, 1949, at Northbridge, New South Wales.

RICHARD THOMAS KENNEDY.

We regret to announce the death of Dr. Richard Thomas Kennedy, which occurred on April 18, 1949, at Gundagai, New South Wales.

PATRICK GABRIEL HEFFERNAN.

We regret to announce the death of Dr. Patrick Gabriel Heffernan, which occurred on April 19, 1949, at Lewisham, New South Wales.

Medical Appointments.

The undermentioned have been appointed to the honorary medical staff of the Royal Alexandra Hospital for Children, Camperdown, New South Wales: honorary relieving assistant honorary dermatologist, Dr. A. B. Gordon; honorary assistant orthopædic surgeons, Dr. C. D. Langton and Dr. G. S. Colvin; honorary assistant orthopædic surgeon to physiotherapy department, Dr. C. M. Maxwell; temporary honorary relieving assistant surgeon, Dr. R. G. Bligh.

The undermentioned have been appointed as honorary officers of the Royal Adelaide Hospital, Adelaide: assistant to the gynæcological department, Dr. G. T. Gibson, clinical assistant in pathology, Dr. D. L. Wilhelm; temporary clinical assistant to the surgical section, Dr. M. K. Smith and Dr. D. S. Kidd; temporary clinical assistant to the ophthalmic section, Dr. D. W. Brummitt; temporary clinical assistant to the ear, nose and throat department, Dr. P. G. Jay.

Nominations and Elections.

The undermentioned have applied for election as members of the Tasmanian Branch of the British Medical Association:

Penn, Henry Peter, M.B., B.S., 1948 (Univ. Melbourne), General Hospital, Launceston.
McIntyre, Edgeworth David, M.B., B.S., 1948 (Univ. Melbourne), General Hospital, Launceston.
Currie, Trevor Talbot, M.B., B.S., 1947 (Univ. Melbourne), General Hospital, Launceston.
Semmens, Kelman, M.B., B.S., 1947 (Univ. Melbourne), General Hospital, Launceston.

The undermentioned have applied for election as members of the New South Wales Branch of the British Medical Association:

Grant, Alexander Falconar, M.B., B.S., 1948 (Univ. Sydney), Royal Prince Alfred Hospital, Camperdown.
Anderson, Thomas William, M.B., B.S., 1946 (Univ. Sydney), 17 Grantham Street, Burwood.

The undermentioned have been elected as members of the New South Wales Branch of the British Medical Association:

Backner, Daniel Douglas, M.B., B.S., 1947 (Univ. Sydney), 12 Elva Avenue, Killara.
Burfitt, Barbara Joyce, M.B., B.S., 1940 (Univ. Sydney), Yeoval, New South Wales.
Degotardi, Joan Alice, M.B., B.S., 1948 (Univ. Sydney), Base Hospital, Tamworth.
Fewtrell, Ralph Douglas, M.B., B.S., 1948 (Univ. Sydney), Flat 1, 109 Ben Boyd Road, Neutral Bay.
Fisher, Alan Eric, M.B., B.S., 1948 (Univ. Sydney), Ryde District Soldiers' Memorial Hospital, Eastwood.
Knowles, Robert Raymond, M.B., B.S., 1947 (Univ. Sydney), Tullamore, New South Wales.
Maddison, David Clarkson, M.B., B.S., 1948 (Univ. Sydney), Royal Prince Alfred Hospital, Camperdown.
Needham, Robert Frederic Howe, M.B., 1946 (Univ. Sydney), Booker Bay, Woy Woy.
Poyzer, Kenneth George, M.B., B.S., 1948 (Univ. Sydney), Royal Prince Alfred Hospital, Camperdown.
Roberts, Gwyneth Emilie, M.B., B.S., 1948 (Univ. Sydney), Rachel Forster Hospital, Redfern.
Simpson, John Heaton, M.B., B.S., 1937 (Univ. Sydney), 101 Willoughby Road, Crow's Nest.
Trenerry, Edwin John, M.B., B.S., 1948 (Univ. Sydney), Sydney Hospital, Sydney.
Turner, Leslie Vere, M.B., B.S., 1946 (Univ. Sydney), 159 Longueville Road, Lane Cove.

Diary for the Month.

MAY 3.—New South Wales Branch, B.M.A.: Organization and Science Committee.
MAY 4.—Victorian Branch, B.M.A.: Branch Meeting.
MAY 4.—Western Australian Branch, B.M.A.: Council Meeting.
MAY 5.—South Australian Branch, B.M.A.: Council Meeting.
MAY 6.—Queensland Branch, B.M.A.: Branch Meeting.
MAY 10.—New South Wales Branch, B.M.A.: Executive and Finance Committee.
MAY 12.—Victorian Branch, B.M.A.: Organization Subcommittee.

Medical Appointments: Important Notice.

MEDICAL PRACTITIONERS are requested not to apply for any appointment mentioned below without having first communicated with the Honorary Secretary of the Branch concerned, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

New South Wales Branch (Honorary Secretary, 135 Macquarie Street, Sydney): Ashfield and District United Friendly Societies' Dispensary; Balmain United Friendly Societies' Dispensary; Leichhardt and Petersham United Friendly Societies' Dispensary; Manchester Unity Medical and Dispensing Institute, Oxford Street, Sydney; North Sydney Friendly Societies' Dispensary Limited; People's Prudential Assurance Company Limited; Phœnix Mutual Provident Society.

Victorian Branch (Honorary Secretary, Medical Society Hall, East Melbourne): Associated Medical Services Limited; all Institutes or Medical Dispensaries; Australian Prudential Association, Proprietary, Limited; Federated Mutual Medical Benefit Society; Mutual National Provident Club; National Provident Association; Hospital or other appointments outside Victoria.

Queensland Branch (Honorary Secretary, B.M.A. House, 225 Wickham Terrace, Brisbane, B.17): Brisbane Associated Friendly Societies' Medical Institute; Bundaberg Medical Institute. Members accepting LODGE appointments and those desiring to accept appointments to any COUNTRY HOSPITAL or position outside Australia are advised, in their own interests, to submit a copy of their Agreement to the Council before signing.

South Australian Branch (Honorary Secretary, 178 North Terrace, Adelaide): All Lodge appointments in South Australia; all Contract Practice appointments in South Australia.

Western Australian Branch (Honorary Secretary, 205 Saint George's Terrace, Perth): Wiluna Hospital; all Contract Practice appointments in Western Australia. All government appointments with the exception of those of the Department of Public Health.

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